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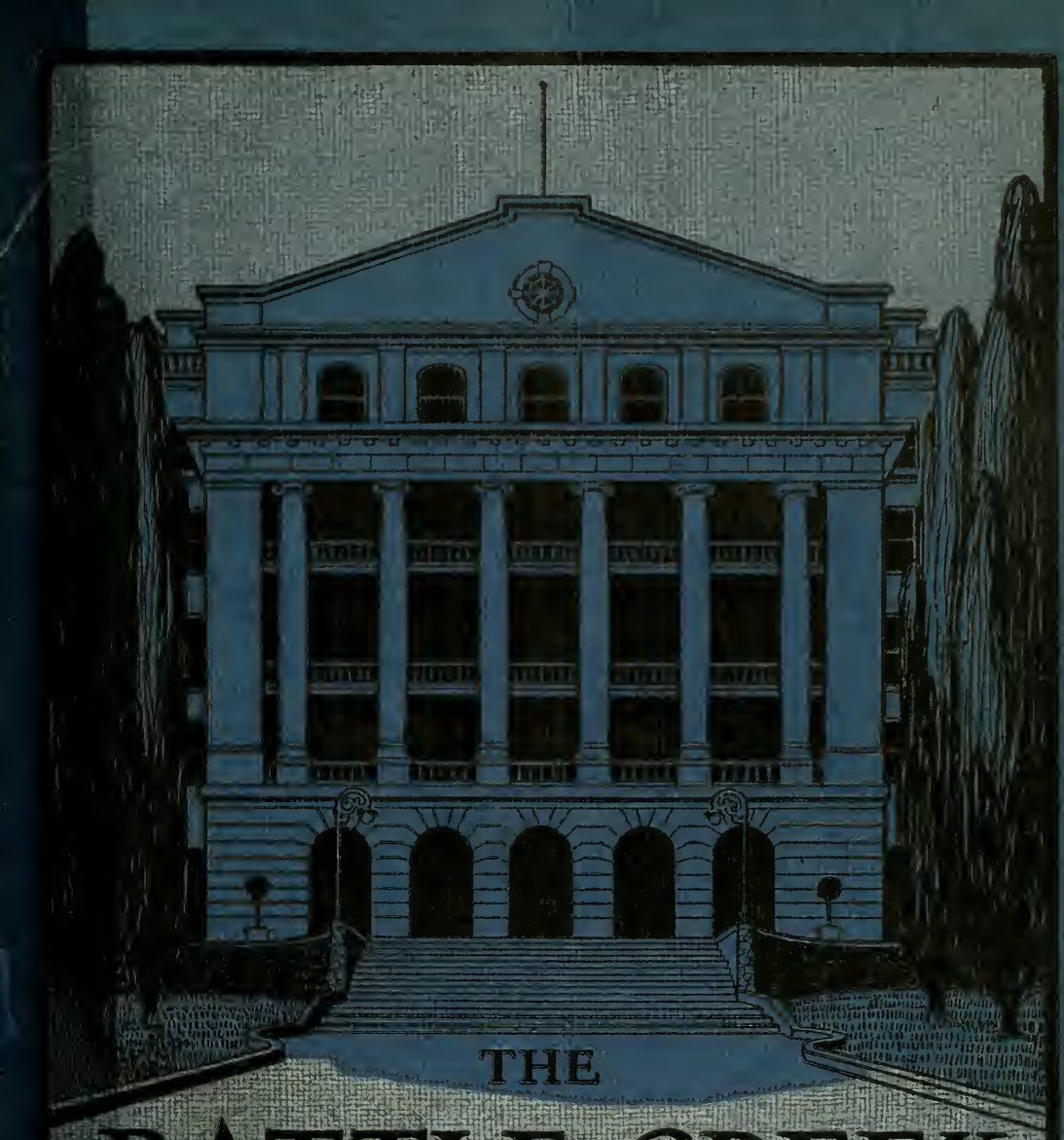

THE BATTLE CREEK SANITARIUM SYSTEM

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THE

Battle Creek Sanitarium

History, Organization, Methods

BY

J. H. KELLOGG, M. D., *Superintendent*

[*Incorporated as a public philanthropy under Act No. 242, as the Michigan Sanitarium and Benevolent Association. Has no "branches," no traveling representatives, and no private interest.*]

BATTLE CREEK, MICHIGAN
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"Nature alone can cure; this is the highest law of practical medicine, and the one to which we must adhere. . . . Nature creates and maintains; she must therefore be able to cure."

—Dietl (1845).

"Diseases are not entities that have entered into the body; they are not parasites that take root in the body; they merely show us the course of the vital processes under altered conditions."

—Virchow (1847).

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FOREWORD

THIS little brochure is presented to the medical public in response to the request of many physicians for a concise epitome of the organized curative methods which in recent years have come to be collectively known as the Battle Creek Sanitarium System.

After consideration it has seemed proper to comply with this request especially because of the surprise and interest manifested by hundreds of physicians who have visited the institution as guests and patients,—surprise because what they found was so different from what they had expected to find, and interest because of the number and variety of practical applications of the latest resources of scientific medicine here systematically employed.

An earnest effort has been made to present a picture of the work carried on at the Battle Creek Sanitarium as nearly as possible as it is daily seen in actual operation.

The existence throughout the country of institutions which have adopted the name "Sanitarium," although really nothing more than medical boarding-houses, has given to the medical profession as well as to the laity many wrong impressions concerning the character of a thoroughly scientific and up-to-date sanitarium. It seems but just that the profession, at least, should know that there "is a difference," that the name Sanitarium, originating here, has been widely exploited and in numberless instances most unworthily represented, and that there is a wide contrast between a scientific sanitarium and the growing multitude of institutions which imitate the name without duplicating the thing itself.

The generosity of the original founders of this institution in devoting all earnings to its equipment, operation, and betterment, and the altruistic spirit which has always dominated its board of managers, have rendered possible the building up of a scientific medical enterprise devoted forever to the public welfare in which the attempt is made—

First.—To put into active, effective, and systematic use every practical method which modern medical science has provided for the accurate determination of deviations from the normal standard of health in structure or function, and for the estimation of the amount of such variation, so far as possible expressing these variations by means of coefficients, so as to make exact comparisons possible.

Second.—To make available in most approved form every rational curative means known to medical science, so that the same may be brought to bear in any individual case, giving special prominence to physical therapy, or so-called physiologic therapeutics.

Third.—To combine with the special professional, technical, and institutional advantages of the modern hospital, the luxuries and comforts of the modern hotel, together with the genial atmosphere, security and freedom of the home.

MAIN BUILDING, DEDICATED 1878, WITH FIRST ADDITION MADE IN 1884

Fourth.—To organize and carry forward various lines of research having for their purpose the improvement of the conditions of human life, especially in relation to diet and nutrition.

Fifth.—The organization and maintenance of various charities, especially hospitals and dispensaries for the treatment of the sick poor.

It is, of course, impossible to present on paper anything like a realistic picture of a work which is necessarily so extensive in volume and so complex in detail; but it is hoped that the numerous accompanying photo-reproductions may aid the reader in forming somewhat of a definite conception of the Battle Creek Sanitarium System as it is seen in daily practice.

PREFACE TO SECOND EDITION

THE favor with which this very imperfect presentation of the Battle Creek Sanitarium Methods, and the organization which makes possible the housing, feeding, and treatment, as well as education and training of a thousand sick people daily, not by routine methods but with minute attention to the needs and indications of each particular case, has encouraged the management to present a second and somewhat improved edition which it is hoped will be equally acceptable to those members of the profession who have not had an opportunity to personally visit Battle Creek, and who are interested in the newer therapeutics which finds its foundations in the results of laboratory research and the application of the principle announced by Dietl, the famous German pathologist, "Nature creates and maintains, therefore she must be able to cure."

Every physician who receives this brochure is cordially invited to visit the institution and to personally inspect its laboratories and various therapeutic departments.

Among the new features which have been added since the publication of the first edition may be especially mentioned notable additions to the Roentgen laboratory which have given it recognition as belonging in the front rank of the world's laboratories of this sort.

Among other important additions may be noted the Electro-cardiograph; the respiration calorimeter of Benedict, for the clinical study of metabolism; important advances in the bacteriological laboratory by the aid of Doctor Tissier, of the Pasteur Institute, Paris, consulting bacteriologist of the institution; a department for the use of radium in all the various ways in which recent research has found to be useful—viz., in the treatment of inoperable cancer, and certain forms of gout and rheumatism.

Improvements are constantly being made in all departments, both in equipment and methods, in an earnest effort to keep pace with the foremost rank of progressive scientific medicine.

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HISTORY

ORTY years ago a little band of men who believed in altruism and human progress purchased a small two-story farmhouse in a fine grove in the edge of the village of Battle Creek, and opened a "water-cure" under the name of "The Health Reform Institute."

Reorganization

Ten years later the enterprise, after having passed through various vicissitudes and having failed to achieve any considerable degree of success, was placed in the hands of the present management, with twelve patients and a half dozen small two-story wooden buildings.

The new management inaugurated new policies, and introduced new methods and principles. The empirical methods of the oldtime "water-cure" were replaced by rational hydrotherapy, and as rapidly as possible new methods, appliances, and apparatus were added, in the effort to create an institution which would show in practical operation all the resources of rational and physiologic medicine.

The management of the new institution sought, by the aid of the various means of precision afforded by scientific medicine, to perfect, and thus place upon a scientific basis, those natural curative agencies which, having chiefly originated with the laity, were formerly employed almost exclusively by empirics.

Those physicians who came in contact with the institution soon recognized the new order of things, and generally gave much appreciated encouragement. At that time there existed no institution which combined the comforts of the home and the hotel with the medical advantages of the hospital and the added facilities and equipment requisite for the administration of baths of every description, electricity in its different forms, medical gymnastics, and other rational agencies, with careful regulation of diet.

Origin of the Name

The new management and new policies demanded a new name. The word "sanatorium" was then defined by Webster's dictionary as a term used in England to designate a health resort for invalid soldiers. A change of two letters transformed "sanatorium" into "sanitarium," and a new word was added to the English language.

The various changes effected, including rational improvements in the equipment, the establishment of a training school for nurses, and the organization of a corps of scientifically trained physicians, rapidly won the confidence of both the profession and the public, so that within a few months one hundred patients were under treatment; and the management began the erection of a building especially adapted to sanitarium work, the first of its kind, and capable of accommodating two hundred guests.

"THE WATER CURE"—1866

THE BATTLE CREEK SANITARIUM —1876

Within a year the new structure was dedicated (1878), and for twenty-four years thereafter new structures were added, at intervals of four or five years, to accommodate the growing family, which in the summer of 1901 numbered some seven hundred guests.

Fire and Reconstruction

The fire of February, 1902, consumed the main building and the hospital. The brick and wooden structure was replaced by an up-to-date and absolutely fireproof building, systematically planned, and amply equipped to meet the increased needs.

The gradual growth of the institution is shown by the following figures:

The total number of patients during the first year was	106
Ten years later, the total number of patients during the year (1876-7) was	208
After another ten-year period, the total number of patients for the year (1886-7) had grown to	825
During the year 1896-7 the number of patients was	1,584
During the year 1906-7 the number was	2,800
During the year 1911 the number was	5,307

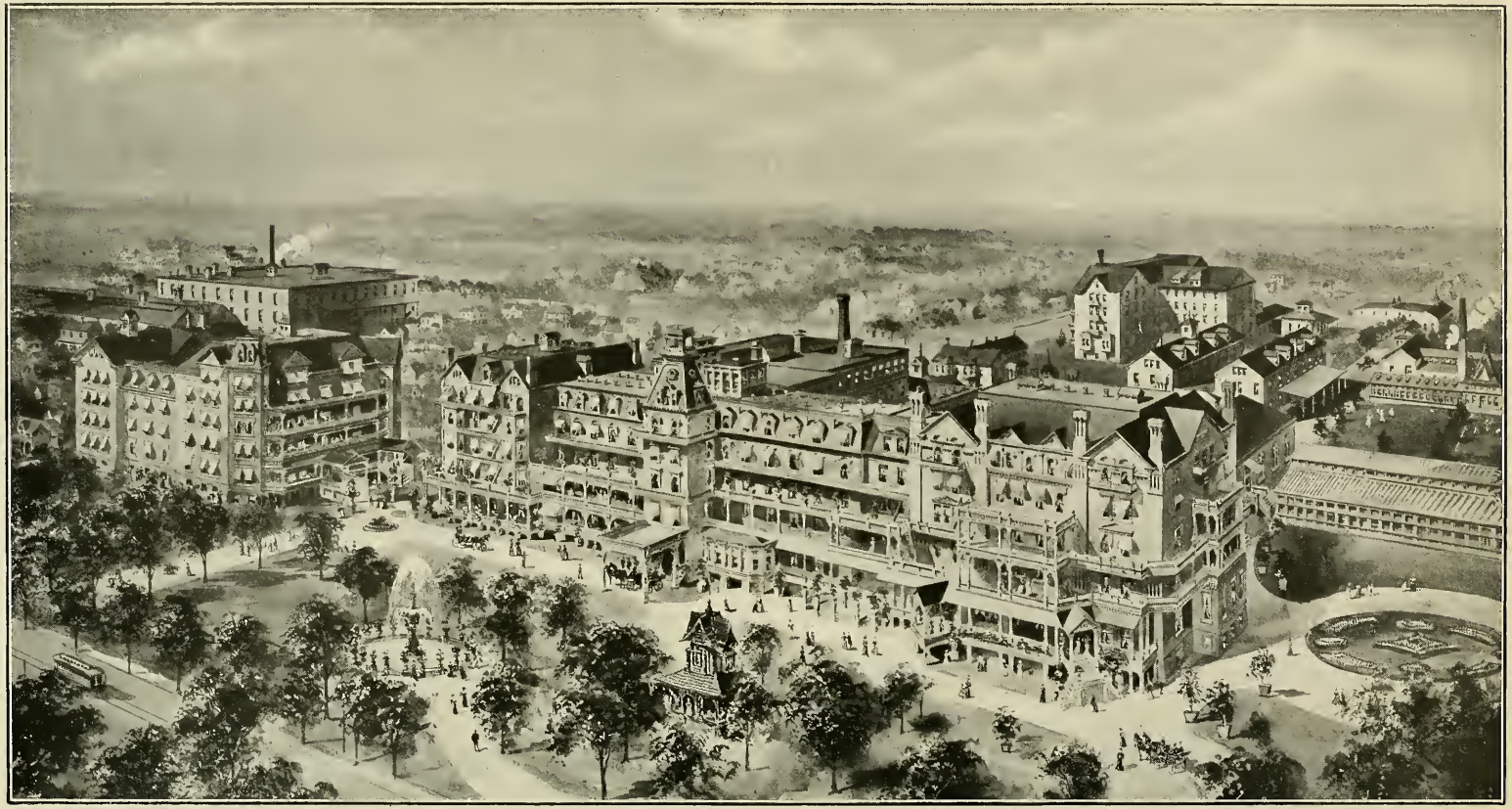
The above figures represent less than half the real number of guests. The actual number of patients during the year 1911 was 5,307.

The care of this multitude of patients requires eight hundred to a thousand persons, including more than twenty physicians and three hundred nurses and bath attendants. Most of the patrons of the institution are persons who are suffering from chronic disease, especially gastric and nervous disorders. *Insane persons, epileptics, and persons suffering from tuberculosis or other communicable diseases are not received.* The guests always include a considerable number of persons who are below par physically from overwork or other causes and visit the institution for the purpose of increasing their efficiency by general health culture and training.

The Physiologic Method

The *Physiologic Method,* sometimes referred to as "the natural method," was forty years ago almost entirely in the hands of empirics. Through the application of the scientific method to the various hydriatic and other procedures of the natural method they have been rescued from empiricism and have been organized into a rational system. The physiologic method consists in the treatment of the sick by natural, physical, or physiologic means, scientifically applied.

The application of the physiologic method requires much more than simply a knowledge of the technique of baths, electricity, movements, etc. It especially requires a knowledge of physiology, and an intelligent grasp of all the resources of modern medical science. For, while the physiologic method depends for its curative effects upon those natural agencies which



THE MAIN BUILDING BURNED FEBRUARY 18, 1902

are the means of preserving health, and which may be relied upon to prevent disease as well as to cure it, it recognizes and employs as collateral and supplementary remedies, all rational means which have by experience been proved to be effective as adjuvants or palliatives.

The Physiologic Method Deals with Causes

The physiologic method concerns itself first of all with causes. In the case of chronic maladies, these will generally be found in erroneous habits of life, which, through long operation, have resulted in depreciation of the vital forces of the body and such derangement of the bodily functions that the natural defenses have been finally broken down, and morbid conditions have been established.

Chronic disease is like a fire in the walls of a house which has slowly worked its way from the foundation upward, until the flames have burst out through the roof. The appearance of the flame is the first outward indication of the mischief which has been going on; but it is not the beginning. It is rather the end of the destructive process.

As Hericourt, the learned author of "Les Frontiers de la Maladie," has well pointed out, the man who is recognized to be suffering from chronic disease, even though the malady may be said to be in an incipient state, has really been ill for some time, as the existence of the disease is evidence of the long-continued insidious operation of subtle causes which have gradually consumed the patient's vital capital, wiped out his margin of safety, and established definite and often permanent pathological conditions. *Disease, then, is not the chief object of attack in the physiologic method, but the causes of disease.*

The physiologic method does not undertake to cure disease, but patients. It recognizes the disease process as an effort on the part of the body to recover normal conditions,—a struggle on the part of the vital forces to maintain life under abnormal conditions and to restore vital equilibrium.

No Routine, No Panaceas, No Fads, No Secret Methods

As regards the methods of dealing with individual ailments, the Battle Creek Sanitarium System offers no panaceas and claims no secret methods or processes. There is no routine or "course of baths," no violent heroic measures, no empirical formulas for any disease or class of maladies. The "system" is simply a rational plan of leading the individual out of suffering and inefficiency into health, comfort, and useful activity. Its claims as a system are based (1) upon a working plan which many years of experience have developed for the ultilization of all rational curative measures, especially those of a physiologic character, combined (2) with the complete supervision and control of the life of the patient, and (3) the application of methods of precision in the study of vital conditions, normal and pathological.

At the outset of his course of treatment, the patient is instructed that his recovery will depend very largely upon himself; that curative power does not reside in the doctor nor in the treatment, but in the vital force operating within the patient himself.

WHAT WAS LEFT FEBRUARY 18, 1902

LAYING THE CORNER STONE OF THE NEW BUILDING, MAY 11, 1902

"It is the Blood That Heals"

Great pains are taken to render the patient intelligent in relation to these facts and principles. He is taught that it is "the blood that heals"; that most chronic disorders are the result of deteriorative changes in the blood; that some abnormal content or some deficiency has led to minute functional or structural changes which, slowly advancing during a long period, have finally resulted in so great a disturbance that attention is called to the fact by symptoms, so that he discovers that he is ill; that the chronically sick person is in a state of low vital resistance, and hence that his treatment necessarily requires, first of all, the exact regulation of all his habits, and the establishment of natural conditions of life. The "simple life" and "return to nature" are the ideals constantly held up before him. He must work out his own salvation; he must "cease to do evil and learn to do well;" he must cease to sow seeds of disease, and by every means in his power cultivate health.

DEDICATION OF THE NEW MAIN BUILDING, MAY 31, 1903

NEW MAIN BUILDING

ORGANIZATION OF THE INSTITUTION

THE application of physiotherapy in a scientific and efficient manner requires a large corps of nurses and assistants who are trained in the technique of hydrotherapy, massage, manual and mechanical Swedish movements, graduated exercises, medical gymnastics, electricity in its varied forms, thermotherapy, mechanotherapy, phototherapy, rational dietetics, the out-door method, and various other physical and physiologic agencies, in addition to the methods of ordinary hospital practice. It is only by this concentrated fire from a well-trained therapeutic battery that those Gibraltars of disease commonly called incurable maladies can be made to capitulate.

Trained Assistants

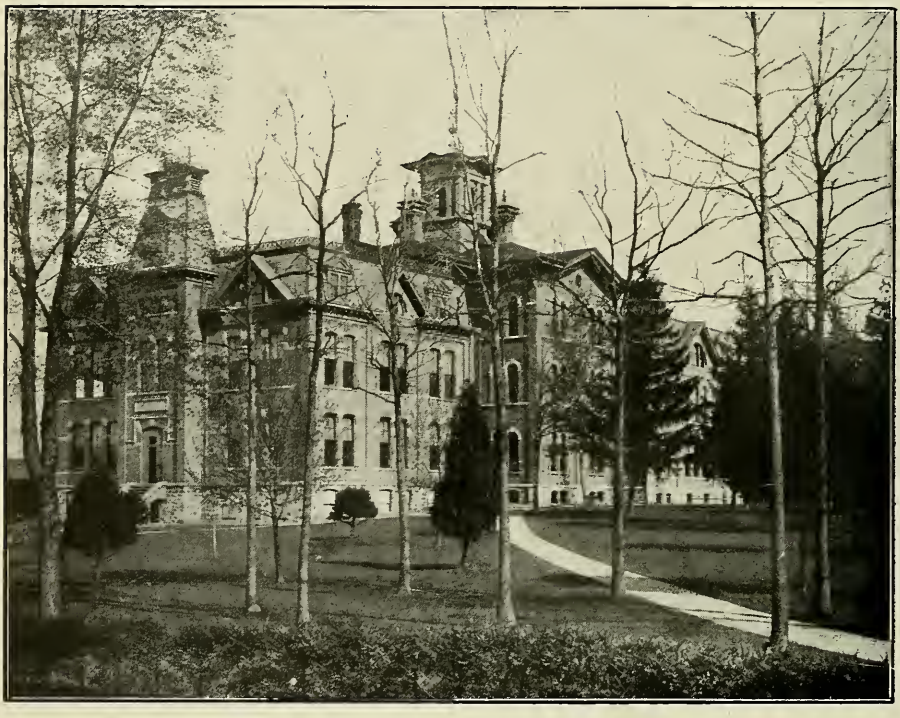
To conduct a sanitarium-hospital on a thoroughly physiologic and scientific plan requires a corps of workers, or "health trainers," averaging for the whole year one to one and a half persons per patient treated. Without the greatest vigilance, the number will increase even to three or more for every patient. For example, at the Battle Creek Sanitarium the number of persons employed is never less than eight hundred, and often rises in the busiest season to more than one thousand. In the summer season the number of patients and employees is about equal. In the winter season the number of patients is often only half that of the employees. Large numbers of attendants must be in training in preparation for the busy months.

To do all that can be done for a chronically sick person to assist him to recovery, to surround such a person with every possible advantage known to modern medical science, requires an expenditure for facilities, attendants, and running expenses far beyond any possible income except under one condition, viz., that many of those engaged in the work shall be willing to make a partial contribution of their services, receiving at most merely nominal wages, barely sufficient to meet the actual cost of living on a very simple basis. Physicians, managers, nurses—everybody concerned in the enterprise, must be interested in it from a scientific and philanthropic standpoint, and willing to consider as chief compensation the satisfaction of seeing men and women restored to health, who, without the services rendered, would have little prospect but the grave.

The Main Buildings

These consist of four large buildings, chief of which is the concrete structure dedicated May 31, 1903. This building, which affords rooming accommodations for about 400 guests, contains also offices for the physicians, treatment rooms capable of handling more than 1,000 patients, dining-room accommodations for an equal number, a gymnasium 120 by 66 feet. The bath buildings are three-story and basement, and with the gymnasium

ROOF GARDEN, MAIN BUILDING

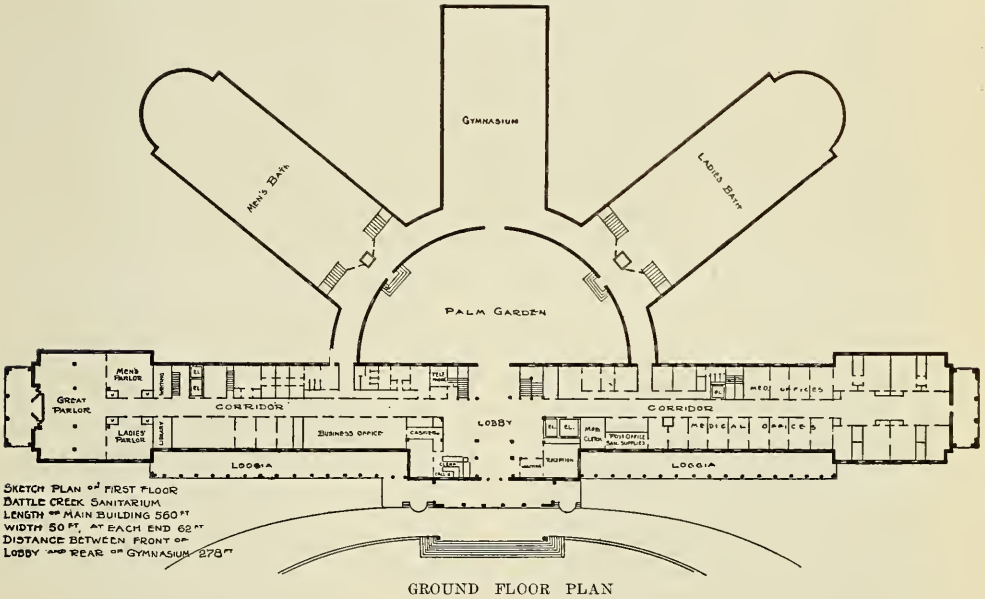


DISPENSARY AND OFFICE BUILDING

are joined to the main building by a semicircular corridor. Within the semicircle is a great Palm Garden, which connects the gymnasium with the lobby of the main building, as shown in the accompanying ground floor plan.

The construction is brick, iron, stone, and Portland cement. There are no wood floors nor partitions. The floors are solid slabs of artificial stone, reinforced by strong iron cables. The partitions are of mackolite. The floors are surfaced with Italian terrazza mosaic.

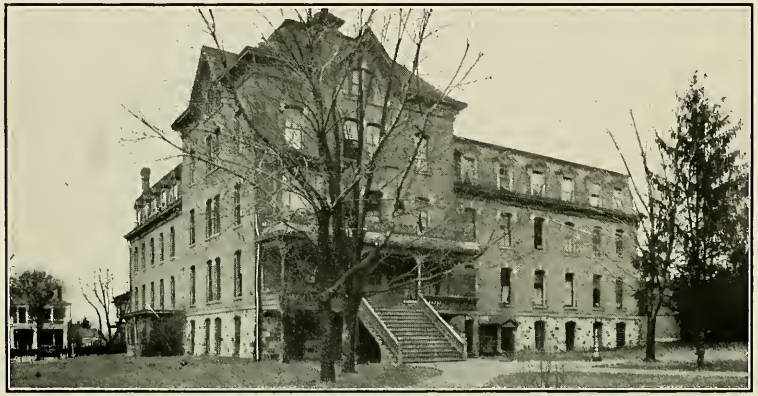
The building being frost-proof as well as fire-proof, it is easy to maintain a uniform artificial climate in the cold months, with a day temperature of 70 degrees F. and a night temperature of 60 degrees F.



GROUND FLOOR PLAN

A most efficient ventilating system supplies more than one hundred and fifty thousand cubic feet of warm fresh air per minute. The fresh air is admitted warm to the corridors, and distributed by means of individual ducts, connecting each room directly with the open air. The ventilation system is automatic and always works. The ducts are of sufficient capacity to give each patient's room an ample supply of air for five or six persons. The air of the building is always and everywhere fresh and pure, and free from odor of every sort. This is chiefly due to the location of the kitchen and dining-room at the top of the building. The heavy masonry construction of the building with the stone floors render it cool in summer as well as warm in winter. There being no wood floors and no carpets, there is freedom from dust (rugs are used and vacuum cleaning). The wide corridors and simple style of structure secure free movement of air. There are pleasant parlors and ample foyers on every floor. There are also porches and balconies on each floor and a large roof garden which is partly covered and used for outdoor sleeping.

WEST HALL



SOUTH HALL

EAST HALL

The building has been erected and equipped at a cost of $800,000.00, and no pains or expense has been spared to make it in every way thoroughly fit for the purpose for which it is used.

A Tropical Corner

The large palm garden (40 x 60 ft.) is separated from the great central lobby by a glass partition, and its fresh, genial atmosphere and delightful tropical plant life make it a favorite place of resort. A corridor leads through the center of the palm garden from the main lobby to the great gymnasium.

The sight of bunches of bananas ripening on huge stems towering twenty feet in height suggests the tropical delights of Florida in the midst of the splendid health-winning, pure winter air of Michigan.

Patients are fond of gathering under the wide-spreading palms to chat over their lunches served on trays while enjoying the tropical scene and the pure fragrant air.

Recognized as a Philanthropy

The institution is incorporated under a statute of the State of Michigan which provides for the organization of hospitals and other charitable institutions and exempts them from taxation.

Shortly after the great fire which destroyed the main buildings of the institution the Battle Creek Business Men's Association and Board of City Aldermen, by request of the Sanitarium Management, appointed a committee consisting of three of the leading business men, a leading clergyman, and the president of the City Bank, to look into the affairs of the institution. The two pages which follow present the essential portion of the committee's summary of their findings respecting the object, character, work, and administration of the institution:

THE LOBBY

THE MAIN PARLOR

REPORT OF THE CITIZENS' COMMITTEE

"Summing up the results of our investigations, we have to report as follows:

"1. The Sanitarium is organized under the provisions of Act No. 242 of the Public Acts of the State of Michigan as a philanthrophic and charitable institution.

"The Articles of Association of the Battle Creek Sanitarium, so far as they relate to the questions involved in our investigation, provide as follows:

" 'The object of said corporation and other matters germane and auxiliary thereto, are as follows:

The Charitable and Philanthropic Objects of the Organization

" '*To found a hospital or charitable asylum within the State of Michigan for the care and relief of indigent or other sick or infirm persons, at which institution may be received also patients and patrons who are able to and do pay for the benefits there received, and which institution shall devote the funds properly acquired and received by it from time to time from all sources, exclusively to maintaining itself, improving its condition and facilities and promoting its purposes, by such sanitary, dietetic, hygienic, and philanthropic reforms and efforts as are germane or auxiliary thereto; all of its said purposes being undenominational, unsectarian, philanthropic, humanitarian, charitable, and benevolent, and in no manner directly or indirectly for private profit or dividend paying to any one.*'

"3. It is therefore clear:

"a. That no profits of the institution can ever accrue or be lawfully paid to any private party or parties whatsoever.

"b. That no funds of the institution can be lawfully sent outside the State to build or support other enterprises of any kind.

"c. That any and all revenues of the institution must be devoted to philanthropic and charitable work within the State of Michigan, and to developing and extending the facilities of the institution itself, and for these purposes only.

"d. That all of the property of the institution is held in trust for the above philanthropic and charitable purposes only.

"e. That title to any of the property of the institution can never be passed to any private party or parties whatsoever, but can only be transferred at the expiration of the statutory limit of the corporation to the trustees of another corporation organized for the same purpose and under similar restrictions. . . .

"The revelations made by our investigation have been a surprise to us. Not only were we personally unaware of the wholly philanthropic nature of the institution, under the law, but we were also unaware of the vast amount of charitable work performed by it, and the wonderful saerifices made by the managers and employees generally.

"The large corps of physicians receive no professional fees, and only weekly wages so small that their services are practically a charity. This is also true of the hundreds of nurses and helpers. They are a band of

THE PALM GARDEN

sincere people, conscientiously devoting themselves to a great work for humanity, and not for personal gain. . . .

"The more deeply we have gone into the investigation, the more convincing and overwhelming the proofs have become of the straightforward management, the lofty purpose, the widespread beneficence of the institution, and above all, of the personal devotion and wonderful self-sacrifice of the nearly one thousand persons employed in it.

"Respectfully submitted,

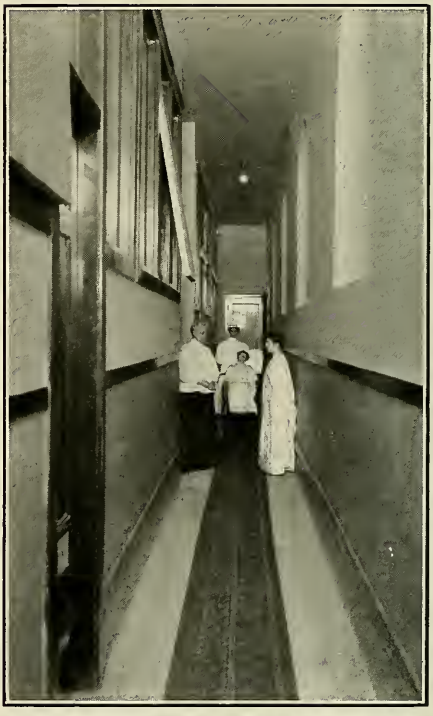
"S. O. BUSH,
"I. L. STONE,
"GEO. E. HOWES,
"W. S. POTTER,
"NELSON ELDRED,
"Committee."

The above findings of the committee concerning the philanthropic character of the institution were confirmed by the decision in favor of the institution in the tax suit brought for the purpose of determining the status of the institution in its claim to exemption from taxes because of no private interest in its earnings.

AN EXAMINING OFFICE

THE LADIES' RECEIVING OFFICE

MEN'S CORRIDOR



WOMEN'S CORRIDOR

THE BATTLE CREEK SANITARIUM SYSTEM

THE application of the physiologic method requires for its foundation more than an answer to the question, What disease has this patient? Is it rheumatism, dyspepsia, locomotor ataxia, neurasthenia, etc.? It demands a minute inquiry into the exact vital status of the individual; a determination of the degree of activity and efficiency of each of the great bodily functions. It requires a complete inventory of the patient's vital assets.

To accomplish this, the patient must be tested and calipered by every means known to science, and the results must be reduced to the most exact mode of expression, to coefficients and "graphies" when possible, for convenience of comprehension and comparison.

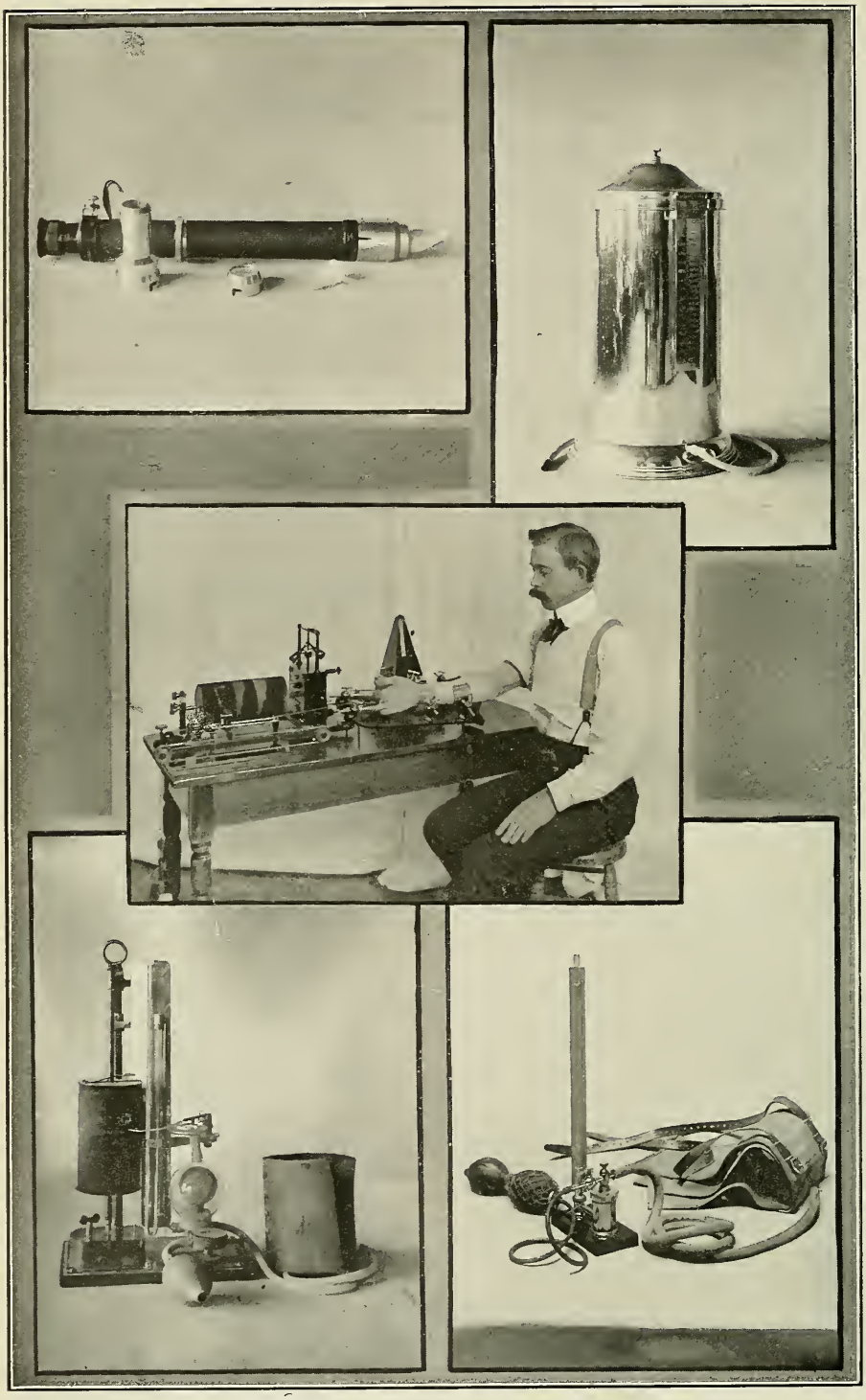
These examinations must be made, not once, but many times, being repeated at frequent intervals, so that the effect of the treatment may be recognized, and any necessary modifications may be made.

Receiving the Patient

The patient, on his arrival at the Sanitarium, after having selected his room, visits the medical office, where his name and address are taken by the receiving physician, and a few general facts respecting his case ascertained, sufficient to make clear the general character of his case; that is, whether it be surgical or medical, and if medical, whether the services of a specialist will be required, and if so, which department is indicated. The patient is then assigned to the particular one of the thirty physicians employed in the institution who is especially qualified by training and experience to best deal with his particular case, and there is placed in his hand a blank prescription booklet which bears his name and number, together with the name of the physician to whom he is assigned. In this booklet will be recorded the various prescriptions for hydrotherapy, phototherapy, mechanical and manual movements, walking, swimming, and other exercises, hours for rest, suggestions concerning diet, including the quantities expressed in calories of proteins, carbohydrates and fats, and general suggestions. The book also contains blanks for the records of the daily meals, of strength and weight tests, and a blank program on which the physician will indicate the hours for the various treatments, exercises, and measures to which the patient is to be subjected during each day.

The Examination

The physician designated takes the patient in hand, and listens to his own account of his ailments. Assistance is often rendered by the letter of introduction which the patient often brings from his home physician. In this examination the aim is not simply to discover symptoms but to learn the exact state of the fundamental vital processes,—what is the condition of the patient's metabolism? Does metabolic insufficiency exist? Is an abnormal degree of tissue destruction taking place? To what degree is the functional efficiency of any vital organ or set of organs diminished,



INSTRUMENTS EMPLOYED IN DIAGNOSIS

especially as regards muscle, heart, lungs, stomach, blood, liver, kidneys? All known means are brought to bear to discover any possible organic changes in the brain or nerves, heart, liver, kidneys, arteries or other vital parts. Special emphasis is laid upon certain points which are of particular interest in the application of hydriatic and other physiologic methods.

The patient removes his clothing, or so much of it as is necessary, and is subjected to a minute physical examination.

Then examination of the viscera is made so far as they are accessible by physical means, inspection, palpation, auscultation, percussion, etc.

In cases which indicate the necessity therefor, an internal examination is made.

The patient is referred to experts in various departments, as the indications may suggest.

The X-ray, through stereo-radiography and fluoroscopy with the bismuth meal, renders valuable service. The electro-cardiograph, the sphygmograph, and other graphic methods are employed, together with the respiration calorimeter and all known efficiency tests.

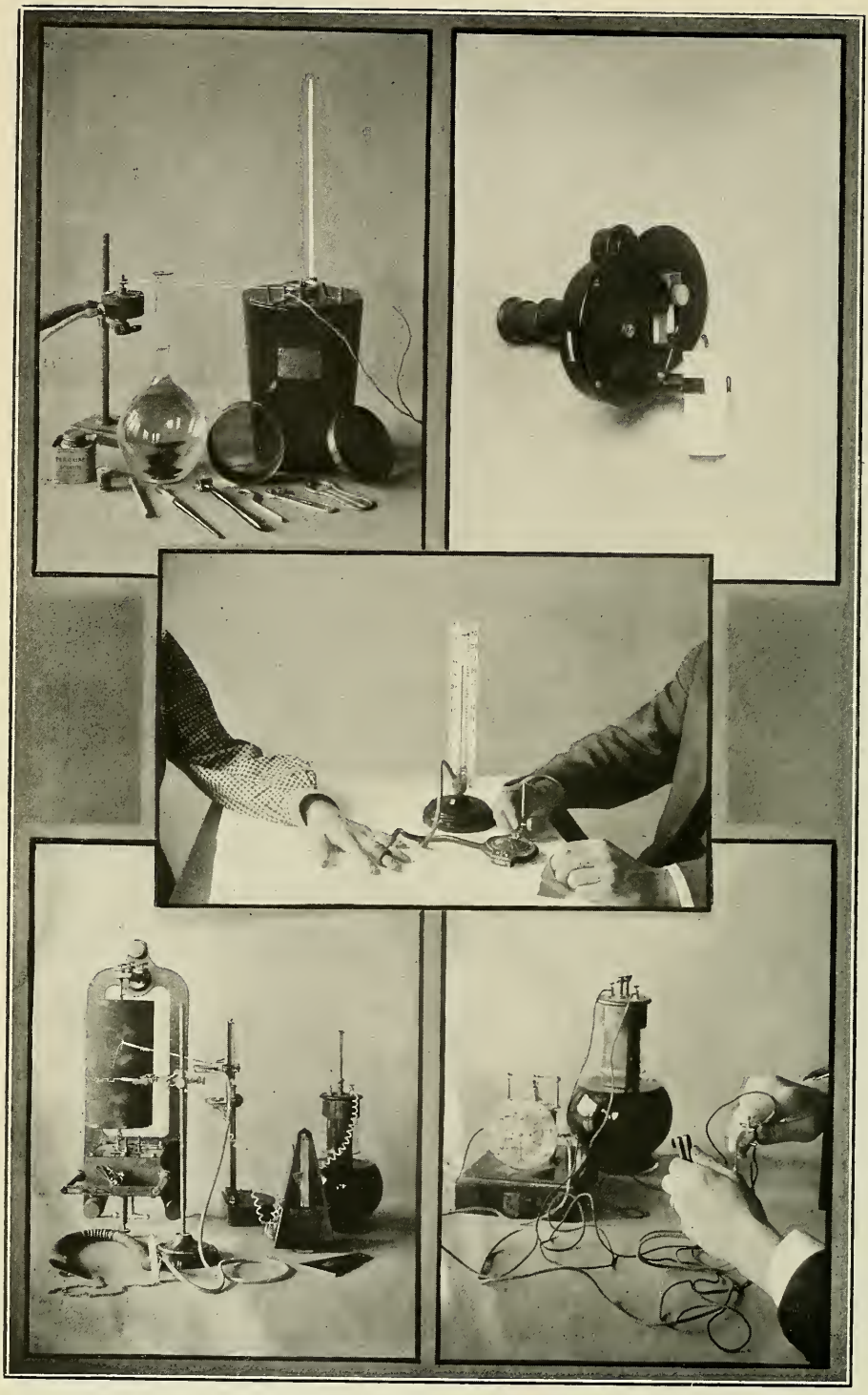
Examination of the Skin

In making the physical examination, first attention is given to the skin, note being taken not only of the color of the skin, as indicative of anemia, chlorosis, Addison's disease, jaundice, metallic poisoning, certain drug effects, etc., and of the presence or absence of common skin maladies, but also of its texture and appearance,—whether it is dry or moist, etc. The effects of mechanical and thermic stimuli are studied. Special note is taken of the indications of intestinal autointoxication, concerning which the skin rarely fails to give accurate and reliable information. In the employment of hydrotherapy, the study of the skin is particularly important, for the reason that a bloodless, hide-bound skin, dry and rough to the touch, not only indicates a deficient peripheral circulation, but is also necessarily associated with an excessive accumulation of blood in the viscera. An anemic skin generally means a congested liver, and the same condition of other viscera. Hydriatic and other physiologic methods are the only means by which this condition of the skin can be permanently improved, hence the only means by which viscera congestion can be definitely removed.

Examination of the Mouth and the Tongue

Careful inspection of the mouth affords information not only in relation to the teeth, but of the body in general, for decay of the teeth or disease of the gums is very frequently a local indication of general vital deterioration; and an infected state of the mouth may be an efficient and continuing cause of intestinal or gastro-intestinal autointoxication. The condition of the tongue and the breath is an important indication in relation to intestinal autointoxication, a condition of primary importance in the etiology and the therapeutics of chronic diseases.

Bacterial cultures are made in cases in which there is reason to suspect



INSTRUMENTS EMPLOYED IN DIAGNOSIS

infection of the mouth with pathogenic bacteria. The throat, nose, tonsils, and pharynx are inspected especially with reference to local infection and a possible relation to intestinal autointoxication or other systemic disease.

Testing the Lungs and the Heart

The lungs are examined by the ordinary means, including determination of the lung capacity. In addition, determination is made, by means of the universal dynamometer, of the strength of the diaphragm and of the muscles of the chest. Imperfect aeration of the blood is not infrequently the result of weakness and lack of tone of the respiratory muscles, although the actual lung capacity may be ample. Many feeble invalids live in a state of half asphyxiation, notwithstanding a splendid lung capacity, because of deficient respiratory activity. Respiratory strength and respiratory weight coefficients are obtained, which show at once the degree to which the respiratory function is deficient.

In addition to a stethoscopic examination and a careful noting of all the indications of cardiac or circulatory disturbances, a determination is made of the blood-pressure, both systolic and diastolic.

X-Ray Examination of the Heart

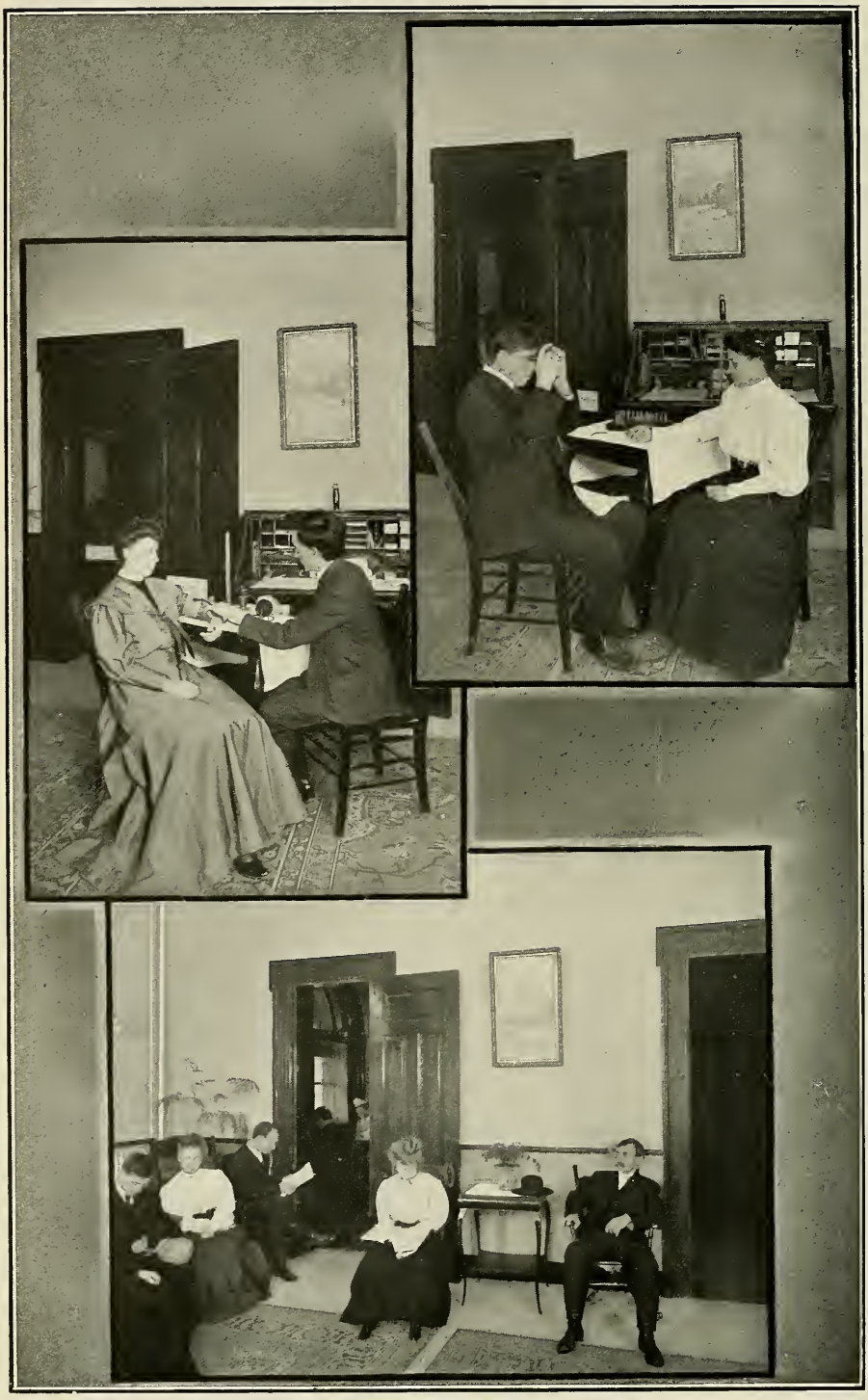
The marvelous advances made in X-ray technique within the last five years have rendered this examination the most important and reliable means of determining the size and position of the heart and large vessels. By a very powerful apparatus which has recently been perfected, it is possible to obtain a radiograph of the heart in a small fraction of a second so sharp and accurate outlines of the heart are obtained. It is now also possible to apply the Roentgen cinematograph to the study of the movements of the heart. The views of the heart and chest, as shown herewith, are fair illustrations of the valuable aid given by the Roentgen laboratory of the institution in the study of diseases of the heart and blood-vessels.

The Electro-Cardiograph

The discovery that contractions of the heart are accompanied by the production of electrical currents which can be measured, made by Waller more than twenty years ago, has finally led to the perfection of apparatus by means of which information can be obtained respecting the morbid conditions of the heart, both organic and functional, which cannot be obtained in any other way. This new method, which is of the greatest value in the study of diseases of the heart, is as yet very little known on this side of the Atlantic. The management congratulate themselves in being among the first to introduce into this country this important means of diagnosis. The accompanying plate shows the forms of cardiograms obtained in different conditions of the heart and blood-vessels (Nicolai).

Study of the Blood-Pressure

The arteries are examined for evidence of degenerative change, note being taken of the condition of both the arteries and the veins. Sphyg-



BLOOD EXAMINATIONS

mographic tracings are made of the pulse, and cardiograph tracings are made when there is any indication therefor. The growing prevalence of arteriosclerosis, and the recognition of the important part which this disorder plays in a large number of chronic maladies, give to this feature of the examination an importance which has come to be fully appreciated only in recent times.

This research is especially important in the employment of the physiologic method for the reason that this method is the most efficient remedy for disorders of blood-pressure. These conditions are purely symptomatic, and can be relieved only by dealing with their causes. It is now generally recognized that drugs which raise or lower blood-pressure are only palliative in their effects, and, on the whole, do more harm than good. Most drugs which diminish high blood-pressure ultimately produce secondary low pressure, a still worse condition.

The resources of hydrotherapy render most valuable service both in high-pressure and low-pressure cases. In their application these measures must be most carefully gauged by the findings of the sphygmomanometer.

In making blood-pressure determinations, both the systolic and diastolic readings are recorded.

These examinations are made by an expert daily at the Physiologic Laboratory at 12 M. to 1 P. M. Patients are examined in their rooms when unable to visit the office.

The large number of blood-pressure determinations which have been made, numbering to date (July, 1912) over 30,000, has demonstrated some very important practical facts in relation to the advantages of the physiologic method. A second examination nearly always indicates a marked fall within two or three weeks in high-pressure cases; while an equally favorable rise occurs in cases in which the blood-pressure is abnormally low. This fact, it is believed, demonstrates in a large way the advantages of the antitoxic diet and toxin-free regimen.

When the blood-pressure has been brought down from 200 mm. to 150 mm., or less, the usual result in cases not too far advanced, by the correction of the patient's habits of life, and the application of physiologic measures, and without the use of drugs of any sort, there is good ground for expectation that by carefully following a prescribed regimen the patient may retain the benefits which have been received, and thus his span of useful life may be considerably lengthened.

Examination of the Blood

This includes not only the determination of the hemoglobin by means of Dare's instruments, but a determination of the blood-count,—that is, the number of blood-cells per cubic millimeter.

In cases of anemia, suspected malarial infection, and all cases in which other special indications are present, a differential count of the blood is made. In cases in which gouty conditions are suspected, Garrod's test for uric acid in the blood is made.

A bacteriological examination of the blood is made in cases in which such an examination is likely to aid in diagnosis, as in suspected malignant endocarditis and other blood infections.

Dr. E. K. H.

No. 37123

BATTLE CREEK SANITARIUM CLINICAL LABORATORY

REPORT ON BLOOD EXAMINATION

Case of Mrs. E. S. *State* Iowa

PER CENT

Hemoglobin. Dare 64

Red Cells. No. 3,500,000 per cu. mm. (Normal { Men - 5,000,000 / Women 4,500,000 }) 77

White Cells. No. 16,800 per cu. mm. (Normal 7,500) 225

One to 208 red (Normal 1 to 666) **Color Index or Coefficient** 83

Specific Gravity (Hammerschlag) 1049

Blood Pressure. Systolic 125 Diastolic 110

Pulse 96

DIFFERENTIAL COUNT OF 600 LEUCOCYTES

NORMAL ELEMENTS	NUMBER COUNTED	PER CENT OF ENTIRE LEUCOCYTE COUNT	NORMAL PER CENT	PATHOLOGICAL ELEMENTS
Small Lymphocytes	360	60	(22-25)	Myelocytes +
Large Lymphocytes	90	15	(3-6)	Normoblasts
Large Mononuclear Leucocytes			(1-2)	Intermediate
Transitional Forms	+	+	(1-2)	Megaloblasts
Polymorphonuclear Neutrophiles	140	23.	(70-72)	Microcytes +
Eosinophiles	13	2.	(2-4)	Macrocytes +
Mast Cells	7	1.	(.5)	Poikilocytes +

Average measurement of red cells 7 1/2 mikrons. (Normal 7½ mikrons.)

Morphology.

Parasites and other pathological elements None present

This test to be repeated in

Remarks

A. W. N. *Analyst*

Date 8/26 1907 12 ~~A.~~ M.

Blood determinations are made at the same hour daily, so that the findings may be properly comparable. In cases in which there is marked deviation from the normal standard, frequent re-examinations are made.

Gastric Examinations

In the office examination the physician makes note of the position of the stomach, which is determined by percussion, palpation, inflation, the X-ray, and other means.

Various tests for determining the gastric motility are made use of.

When there is an indication therefor, a test meal is administered: first, the test breakfast of Ewald; later, if necessary, a test dinner or a test supper, the test meal of Boas, or other special meals as may be indicated. If the patient vomits, an examination is made of the vomited matters.

The nature of the test meals and the method of administration are those ordinarily employed, hence need not be described.* A difference exists, however, in one important particular: the test meal, of whatever sort, is made thoroughly aseptic before it is administered. Care is taken also to make the tube thoroughly sterile. Ordinary bread is not used, as it contains immense numbers of bacteria, and often yeasts and molds. Plain water bread, specially prepared in the form of zwieback, so as to be perfectly sterile and wholly free from bacteria, lactic acid, or other foreign substances, is invariably used.

The chemical technic employed is essentially that of Hayem and Winter, of Paris, very elaborate and tedious, but of all methods the most exact. This quantitative method gives information which can be obtained by no other, and when supplemented by some of the methods of Toepfer, Mett, and Marley, with some devised in our own laboratory, leaves nothing overlooked that can be determined by chemical tests.

A thoroughly practical and efficient method of estimating the products of carbohydrate digestion in the stomach was worked out in our laboratories many years ago (1895), and has been in use since, having been applied in more than 25,000 cases. This estimation of sugar and other soluble carbohydrates is the only means of determining the degree of activity and efficiency of salivary digestion.

Gastric examination is the bacteriological study which was begun more than twenty years ago and has been found to be of great service in dealing with many forms of gastric disease, particularly chronic gastritis and achylia. These examinations are repeated until the stomach is found to be free from bacteria.

Flouroscopic and Cinematographic Examinations of the Stomach

By fluoroscopic examination of the stomach and intestine after a bismuth meal complete information may be obtained respecting the motility of these organs. The accuracy of the findings made by these methods has been tested in many hundreds of cases in which subsequent operation was performed. These new methods of examination have thrown great light

*Methods of Precision in the Investigation of Disorders of Digestion. Read before the Mississippi Valley Medical Association, Oct. 13, 1892. Modern Medicine Publishing Co., Battle Creek, Mich.

BLOOD LABORATORY

upon the physiology as well as the pathology of the stomach. By their use in connection with stereoscopic radiographs it is possible to locate with almost unerring certainty ulcers, neoplasms adhesions and other morbid conditions which were formerly in many cases beyond the reach of the best diagnostic skill.

The accompanying illustration will give something of an idea of the invaluable service rendered by the radiographic department in the study of diseases of the stomach and intestines. Highly useful information may be obtained by radiographic and fluoroscopic examinations of the stomach in all cases of chronic disease of this organ.

Bacteriological Examinations of Gastric Fluids

The systematic bacteriological examination of gastric fluids was begun in the laboratory of hygiene of the Battle Creek Sanitarium in the summer of 1895, and has been continuously carried forward since. The technique developed at that time is still followed in its essential details. Then it was generally believed that bacteria were constantly present in the stomach in considerable numbers; but by employing a sterile test meal, it was discovered that bacteria are only exceptionally present in the stomach, and that their presence is an indication of the absence of an efficient gastric juice. In achylia great numbers of bacteria are always found present, ordinarily two or three million per c.c. of gastric fluid, but occasionally twenty millions or more. This determination is of the highest importance as an indicator for the application of gastric antisepsis and a test of the efficiency of the methods used.

The accompanying photo-reproductions of gastric reports (see page 42) show the findings in the case of an extreme hyper-hydrochloria and in a case of achylia.

Examination of the Feces

Examination of the alimentary residue is scarcely secondary in importance to examination of the gastric contents after a test meal.

Examination of the fecal residue gives us definite information respecting the changes which the food has actually undergone while passing through the entire length of the alimentary canal. The presence of undigested foodstuffs, of unabsorbed fats, proteins, or carbohydrates, of bacteria swarming in numbers vastly greater than the normal, are important facts which have, until recently, been almost wholly left out of consideration. The examination of the feces for tapeworm and other parasites, though essential, is of small importance when compared with the determination of undigested or unused foodstuffs, and the presence of parasitic bacteria in numbers fifty to a thousand times greater than the normal.

An examination of the feces is made in every case. The details of this examination may be readily seen by reference to the accompanying illustration (page 44), which is a copy of a report made in a recent case. Special emphasis is laid upon the bacteriological study of the feces as being of far greater importance in a great majority of cases than the microscopical and chemical study, although chemical and microscopical examinations are not neglected and in a few cases are given essential information.

GASTRIC LABORATORY

By means of the bacteriological examination an exact determination of the condition of the flora is made. The character of the flora determines the dietary and to a considerable degree also the treatment of the patient. By repeated examinations it is possible to show what progress is being made in getting rid of undesirable flora and reinstating the normal protective flora. This department is not only thoroughly equipped with all necessary appliances, but employs a number of skilled and experienced bacteriologists, and in addition has the benefit of the great skill and experience of two consulting bacteriologists who are well recognized as authorities in the bacteriology of the intestinal tract—Professor Tissier, of the Pasteur Institute, Paris, and Dr. Distaso of the Royal Institute of Public Health, London.

Thorough examination of the feces is made in every case on arrival, and in cases requiring it the examinations are repeated at intervals during the course of treatment.

The antitoxic character of the bill-of-fare discourages the growth of putrefactive and other pathogenic bacteria in the intestine, as do also the various means adopted for increasing peristaltic activity and so relieving stasis. In all cases of intestinal autointoxication the patient is encouraged to acquire the habit of moving the bowels at least three times daily, or after each meal. This is not accomplished through the use of irritating drugs, but by regulation of the diet and by restoration of the normal flora, which, as has been shown by Tissier, is alone sufficient in the majority of cases to secure normal bowel action.

Professor Tissier has shown that the normal protective flora of the intestine consists almost exclusively of *Bacillus bifidus* and other acetogenous microbic species. To facilitate the change of flora which is found to be absolutely necesary for a complete cure in most cases of chronic disease, large use is made of cultures of protective micro-organisms, especially cultures of the *Bacillus bifidus* obtained from Professor Tissier of the Pasteur Institute and the *Bacillus Bulgaricus* of Grigoroff. The accompanying plate illustrates the practical value of this method of reinstating the normal protective flora of the intestine.

Radiographic Examination of the Colon

The X-ray department renders invaluable service in the examination of cases of chronic constipation and in cases in which there is suspicion of cancer or other morbid growths in the intestine. By means of stereoscopic radiography of the colon, which was perfected in the Roentgen laboratory of this institution, it is possible to locate the exact seat of stasis in the intestine. The extreme value of the information obtained by means of radiographic examinations of the colon is clearly shown by the following illustrations, which are reproduced from plates selected from hundreds of similar plates on file in our Roentgen laboratory.

By fluoroscopic examination of the colon while introducing bismuth solution, the location of obstructions from contractions or kinks may be exactly determined, together with the degree of existing obstruction. The information obtained by this means is of the greatest service, not only in

GASTRIC GRAPHIC

Case of Mr. F. G.

ARRANGED BY J. H. KELLOGG, M. D.

A	A Total Acidity.	H Free HCl.	C Combined Chlorin.	AC Acid Combined Chlorin.	M Starch Digestion.	Chlorin Liberation. m	n	a	Peptonization x	Starch Digestion. b_1	b_2	Salivary Activity. c	Solution. y	Motility. z
.430	.480	.326	.350	.225	8.00	2.60	2.06	2.50	100	2.06	6.60	16.60	2.00	6.00
.416	.440	.305	.320	.206	7.00	1.80	1.80	2.35	75	1.90	5.60	8.06	1.90	5.00
.380	.410	.290	.300	.186	6.50	1.80	1.86	2.20	50	1.86	4.00	8.06	1.86	4.06
.370	.385	.275	.285	.165	6.00	1.70	1.70	2.10	40	1.70	3.00	7.00	1.70	3.00
.350	.360	.260	.270	.150	5.75	1.65	1.65	2.00	30	1.65	2.50	8.00	1.65	2.50
.335	.340	.245	.255	.140	5.50	1.66	1.66	1.90	20	1.60	2.25	5.50	1.60	2.25
.320	.326	.230	.240	.130	5.25	1.55	1.55	1.80	15	1.55	2.00	5.00	1.55	2.00
.305	.305	.215	.225	.126	5.00	1.50	1.50	1.70	10	1.50	1.75	4.50	1.50	1.75
.290	.290	.200	.210	.110	4.75	1.45	1.45	1.66	9	1.45	1.50	4.00	1.45	1.50
.275	.275	.185	.185	.100	4.50	1.46	1.40	1.50	8	1.40	1.40	3.50	1.40	1.40
.260	.260	.170	.180	.090	4.25	1.35	1.35	1.46	7	1.35	1.36	3.06	1.35	1.35
.245	.245	.155	.165	.086	4.00	1.30	1.30	1.36	6	1.36	1.30	2.50	1.36	1.36
.230	.230	.146	.150	.070	3.75	1.25	1.25	1.25	5	1.25	1.25	2.00	1.25	1.25
.220	.220	.136	.140	.065	3.50	1.20	1.20	1.20	4	1.26	1.26	1.75	1.20	1.20
.210	.216	.126	.130	.080	3.25	1.15	1.15	1.15	3	1.15	1.15	1.50	1.15	1.15
.200	.200	.110	.120	.055	3.00	1.10	1.10	1.16	2	1.10	1.10	1.25	1.10	1.16
.195	.195	.103	.112	.050	2.75	1.05	1.05	1.05	1	1.05	1.05	1.10	1.05	1.05
.190	.196	.095	.105	.045	2.56	1.06	1.06	1.00	0	1.00	1.00	1.00	1.00	1.00
.185	.185	.087	.098	.010	2.25	.95	.95	.95	1	.95	.95	.90	.95	.95
.180	.180	.086	.090	.035	2.06	.80	.90	.96	2	.90	.96	.80	.80	.90
.170	.170	.075	.085	.032	1.80	.85	.85	.85	3	.85	.85	.70	.85	.85
.160	.160	.070	.080	.036	1.80	.80	.80	.80	4	.80	.86	.80	.80	.80
.150	.150	.065	.075	.028	1.45	.75	.75	.75	5	.75	.75	.50	.75	.75
.140	.140	.056	.070	.026	1.30	.70	.70	.70	6	.70	.70	.46	.70	.70
.136	.130	.055	.065	.021	1.15	.85	.65	.65	7	.65	.65	.30	.65	.65
.120	.126	.050	.060	.022	1.06	.60	.86	.60	8	.80	.66	.25	.66	.86
.110	.110	.045	.055	.020	.85	.55	.55	.55	9	.55	.55	.20	.55	.55
.100	.106	.040	.050	.018	.70	.50	.53	.50	10	.50	.50	.15	.50	.50
.085	.085	.035	.045	.010	.60	.45	.15	.45	15	.45	.45	.12	.45	.45
.070	.070	.030	.040	.014	.50	.40	.40	.46	20	.40	.40	.10	.40	.40
.055	.055	.025	.035	.012	.46	.35	.35	.35	30	.35	.35	.08	.35	.35
.040	.040	.026	.030	.010	.30	.30	.30	.36	40	.30	.80	.06	.30	.30
.025	.025	.013	.020	.007	.20	.20	.20	.20	50	.20	.20	.20	.20	.20
.010	.010	.007	.010	.004	.10	.10	.16	.10	75	.16	.10	.02	.10	.10
.000	.000	.000	.000	.000	.00	.00	.00	.00	100	.00	.00	.00	.00	.00

COEFFICIENTS OF DIGESTIVE WORK.

HYPERSTHENIA — NORMAL — ASTHENIA — IMPERFECTLY DISINTEGRATED — WELL DISINTEGRATED

m n a g b_1 b_2 c y z

GASTRIC GRAPHIC

Case of D. B. H.

ARRANGED BY J. H. KELLOGG, M. D.

A	A Total Acidity.	H Free HCl.	C Combined Chlorin.	AC Acid Combined Chlorin.	M Starch Digestion.	Chlorin Liberation. m	n	a	Peptonization x	Starch Digestion. b_1	b_2	Salivary Activity. c	Solution. y	Motility. z
.436	.480	.326	.350	.225	8.66	2.60	2.06	2.50	100	2.06	6.06	16.60	2.00	6.66
.416	.440	.305	.320	.200	7.66	1.80	1.80	2.35	75	1.90	5.06	9.06	1.90	5.00
.396	.410	.290	.300	.186	6.56	1.80	1.80	2.20	50	1.86	4.00	8.06	1.86	4.06
.370	.385	.275	.285	.165	6.06	1.70	1.70	2.10	40	1.70	3.06	7.06	1.70	3.00
.356	.360	.260	.270	.156	5.75	1.65	1.85	2.00	30	1.65	2.50	6.00	1.65	2.50
.335	.340	.245	.255	.140	5.50	1.66	1.80	1.90	20	1.66	2.25	5.50	1.66	2.25
.320	.326	.230	.240	.130	5.25	1.55	1.55	1.86	15	1.55	2.00	5.00	1.55	2.06
.305	.305	.215	.225	.120	5.00	1.56	1.56	1.76	10	1.56	1.75	4.50	1.56	1.75
.290	.290	.200	.210	.110	4.75	1.45	1.45	1.60	9	1.45	1.56	4.00	1.45	1.50
.275	.275	.185	.195	.100	4.56	1.40	1.40	1.56	8	1.46	1.40	3.50	1.46	1.40
.260	.266	.170	.180	.090	4.25	1.35	1.35	1.40	7	1.35	1.36	3.06	1.35	1.35
.245	.245	.155	.185	.090	4.00	1.30	1.36	1.30	6	1.36	1.30	2.50	1.36	1.30
.236	.230	.140	.150	.070	3.75	1.25	1.25	1.25	5	1.25	1.25	2.00	1.25	1.25
.220	.220	.130	.146	.065	3.56	1.26	1.26	1.26	4	1.26	1.20	1.75	1.20	1.20
.210	.210	.126	.130	.066	3.25	1.15	1.15	1.15	3	1.15	1.15	1.56	1.15	1.15
.206	.206	.110	.120	.055	3.00	1.10	1.10	1.16	2	1.16	1.16	1.25	1.10	1.16
.195	.196	.103	.112	.050	2.75	1.06	1.65	1.05	1	1.05	1.05	1.10	1.05	1.05
.186	.196	.085	.105	.045	2.56	1.06	1.06	1.66	0	1.00	1.06	1.06	1.00	1.00
.185	.185	.087	.088	.010	2.25	.85	.95	.95	1	.95	.85	.90	.95	.85
180	.180	.080	.080	.035	2.60	.90	.90	.90	2	.90	.86	.80	.86	.90
.170	.170	.075	.085	.032	1.86	.85	.85	.85	3	.85	.85	.70	.85	.85
.160	.166	.076	.080	.036	1.66	.80	.80	.80	4	.86	.86	.80	.86	.80
.150	.150	.085	.075	.028	1.45	.75	.75	.75	5	.75	.75	.50	.75	.75
.140	.140	.086	.076	.628	1.30	.70	.76	.76	6	.70	.70	.40	.70	.70
.136	.130	.055	.065	.624	1.15	.66	.85	.85	7	.85	.65	.30	.65	.65
.126	.120	.050	.060	.022	1.06	.60	.60	.86	8	.80	.66	.25	.66	.60
.110	.110	.045	.055	.020	.85	.55	.55	.55	9	.55	.55	.20	.55	.55
.100	.106	.040	.050	.018	.70	.50	.50	.56	16	.56	.50	.15	.56	.56
.085	.085	.035	.045	.016	.60	.45	.45	.45	15	.45	.45	.12	.45	.45
.070	.070	.030	.040	.014	.50	.40	.40	.40	20	.46	.40	.10	.40	.40
.055	.055	.025	.035	.012	.46	.35	.35	.35	30	.35	.35	.08	.35	.35
.040	.040	.026	.030	.010	.30	.30	.30	.30	46	.30	.36	.06	.30	.30
.025	.025	.013	.020	.007	.26	.26	.20	.26	50	.20	.20	.04	.20	.20
.010	.010	.007	.010	.004	.10	.10	.10	.10	75	.10	.10	.02	.10	.10
.000	.000	.000	.000	.000	.06	.00	.00	.00	100	.06	.06	.00	.00	.00

COEFFICIENTS OF DIGESTIVE WORK.

HYPERSTHENIA — NORMAL — ASTHENIA — IMPERFECTLY DISINTEGRATED — WELL DISINTEGRATED

m n a g b_1 b_2 c y z

rendering possible an exact diagnosis, but also in suggesting means of treatment.

In the application of massage to the colon the radiograph serves as a most valuable guide.

Tests For Renal Efficiency

The condition of the kidneys is a matter of primary importance in the great majority of cases of chronic disease. The ordinary examination of the urine really gives very little information concerning either the condition of the kidneys or of the metabolic processes of the body. When disease of the kidneys is so far advanced that albumin and casts are found present in the urine, it is generally too late to accomplish anything more for the patient than to arrest the disease and by careful treatment and regimen prolong his life and usefulness. A complete cure is of course impossible. A thoroughly reliable means of determining the actual efficiency of the kidneys in the removal of toxins from the body has been long sought, but until recently no really accurate method was available. We are now in possession, however, of a method by which the efficiency of the kidneys may be very accurately tested. This method, discovered by Drs. Geraghty and Rountree, of Johns-Hopkins Hospital, we have tested in a large number of cases and have found of the very greatest service in determining the condition of the kidneys and thus aiding in settling important questions relating to prognosis, fitness for operation, etc.

Another important test for renal efficiency is the "water test." The patient is given a liter of water in the morning before taking food or liquid and the amount eliminated in the following five hours indicates the power of the kidneys to eliminate water, which is perhaps its most important function. Eighty per cent of the water taken should be recovered in the time named.

The Urinary Examination

As ordinarily made, urinary examinations give comparatively little information. The solid substances found in the urine have two sources of origin; first, the foodstuffs; second, the tissues. No examination of the urine can be considered as exact and resting upon a scientific basis which does not take account of the ingested substances, as well as of those resulting from tissue metabolism.

The first urinary examination is made at once on the patient's arrival. A searching examination of the urine is made by the most exact methods known to physiologic chemistry.

The function of the pancreas is tested by the Cammidge reaction of the urine and by application of the method of Gros to the feces. The efficiency of the liver is also determined by suitable tests.

The Wasserman test for syphilis is made and the opsonic index determined in cases in which these tests are indicated.

The Bacteriological Laboratory

The bacteriological laboratory was equipped and put into operation years ago (1895), after two visits to the Pasteur Laboratory of Paris and

Examination of Feces

No. 14473. Date Sept. 27, 1912.

M. H. A. M. Dr. M.

PHYSICAL

Amount moist	gms.	126
Amount dry	gms.	17.64
Color		Brown
Odor		Putrid
Form		Mushy
Food remnants		Normal
Mucus		Mixed
Parasites		0

CHEMICAL

Reaction	N/10 Acid c. c.	0
	N/10 Alk. c. c.	63
Biuret		trace
Enzymes	Proteolytic	0
	Amylolytic	0
Bile reduction		8
Occult Blood		0
Blood		0

BACTERIOLOGICAL

Dominant Bacteria Many B. Welchii, many B. Coli, Proteus Vulgaris.

Character of Flora Bad

MICROSCOPICAL

Vegetable cells	0
Starch granules	0
Fat globules	0
Fatty acid crystals	0
Soap crystals	few
Yellow calcium salts	few
Ammonio-Magnesium phosphate cryst.	0
Other crystals	phosphates
Pus	0
Blood	0
Epithelia	0
Parasites	0
Parasitic Ova	0

7-29-12—3M

C. N. R. *Analyst.*

other European laboratories, and was placed in charge of an expert who had been trained under Pasteur, in the Pasteur Institute.

This department, in charge of trained bacteriologists, also has the advantage of advice and counsel of two of the most eminent living bacteriologists, who have been for many years connected with the Pasteur Institute of Paris, namely, Professor Tissier of the Pasteur Institute, and Doctor Distaso, formerly first assistant to Professor Metchnikoff, of the Pasteur Institute and now bacteriologist of the Royal Institute of Public Health of London, and consulting bacteriologist to leading London hospitals. Research work is constantly in progress in this department, in which great assistance is derived, as well as in the settlement of individual problems which are constantly arising, from the advice and counsel of the eminent experts above mentioned.

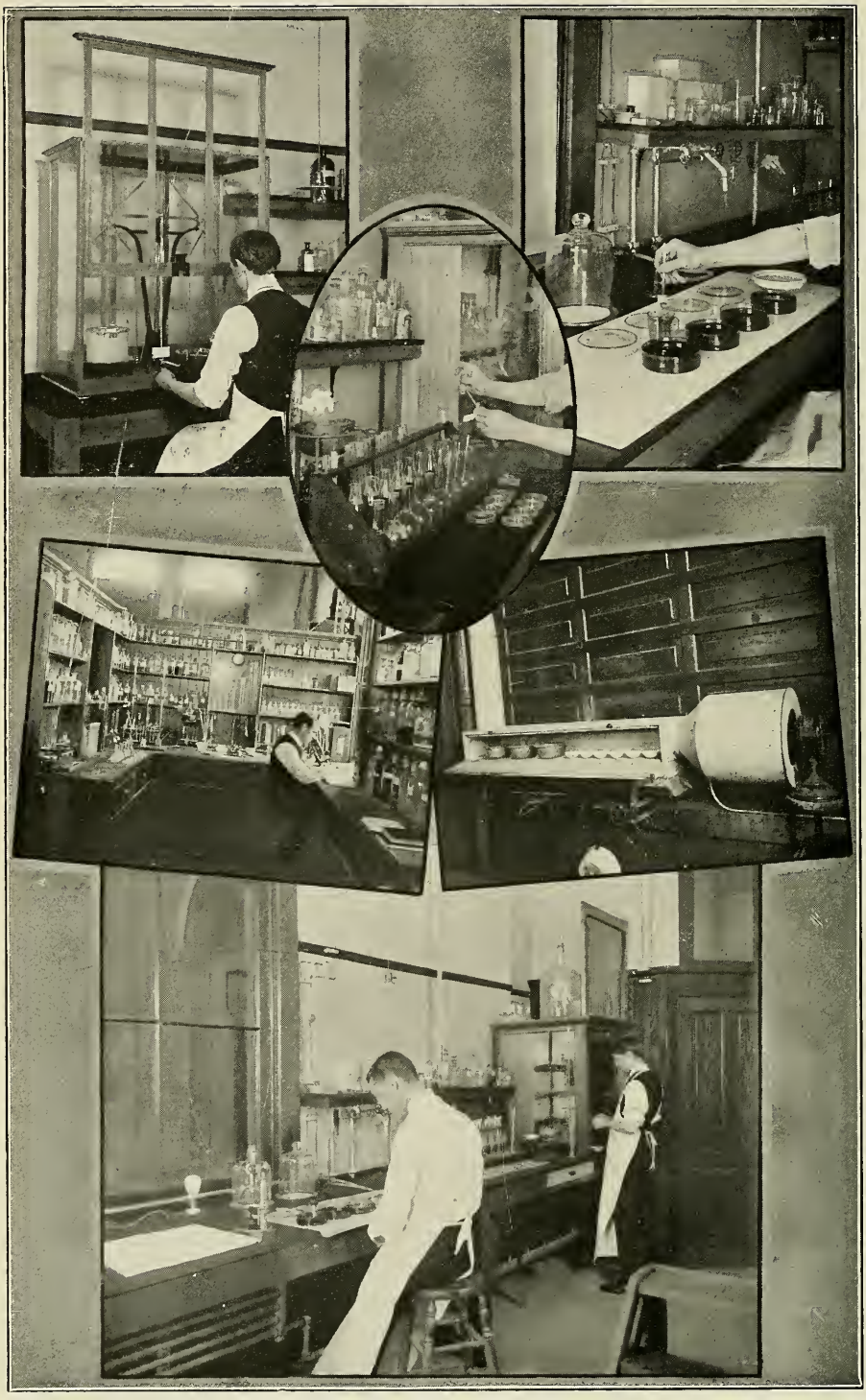
Bacteriological examinations of all sorts and the preparation of vaccines for the purpose of combating various forms of bacterial infection by immunization are supplied by this department to meet the needs of special cases.

In addition to the ordinary sputum and similar examinations which are made in this department, special researches are made for the purpose of determining the presence or absence of bacteria in the blood and other tissues, and original studies are constantly in progress.

A large amount of work is done for the general public and the profession of Battle Creek and vicinity, as the Sanitarium Clinical Laboratory is also the official laboratory for the municipality of Battle Creek. Hundreds of examinations of milk, drinking water, and food supplies of various sorts are annually made for the Health Department of the city, in addition to special examinations of specimens relating to typhoid fever, pneumonia, diphtheria, and other maladies. The report of this department for the year ending Dec. 31, 1911, showed the following work done:—

Report of Clinical Laboratories for the Year 1911

Bacteriological examinations for diphtheria	295
Bacteriological examinations of sputum	378
Bacteriological examinations of gastric fluid	136
Bacteriological examinations of feces	2,598
Bacteriological examinations of urine	48
Bacteriological examinations of blood	14
Determinations of opsonic index	5
Examinations of blood for malarial plasmodia	82
Examinations of blood for trypanasomes	2
Examinations of blood for Widal reaction	86
Examinations of blood for Wasserman reaction	96
Examinations for diplococcus of Neisser	86
Bacteriological examinations of pus	50
Bacteriological examinations unclassified	48
Examinations of blood for blood-count and hemoglobin	6,223
Differential counts of white blood corpuscles	327



LABORATORY FOR FECAL EXAMINATION

Quantitative examinations of urine	7,303
Complete quantitative examinations of urine with determination of uric acid, phosphates, sulphates, ammonia, and total nitrogen	69
Chemical examinations of gastric fluids	1,367
Chemical and microscopical examinations of feces	2,597
Fecal examinations, experimental research	85
Chemical examinations of foods	147
Examinations of foods, experimental research	66
Chemical and bacteriological examinations of milk	192
Chemical and bacteriological examinations of water	46
Microscopic examinations of tissues from operations and autopsies	309
Total	22,655

The Graphic Method

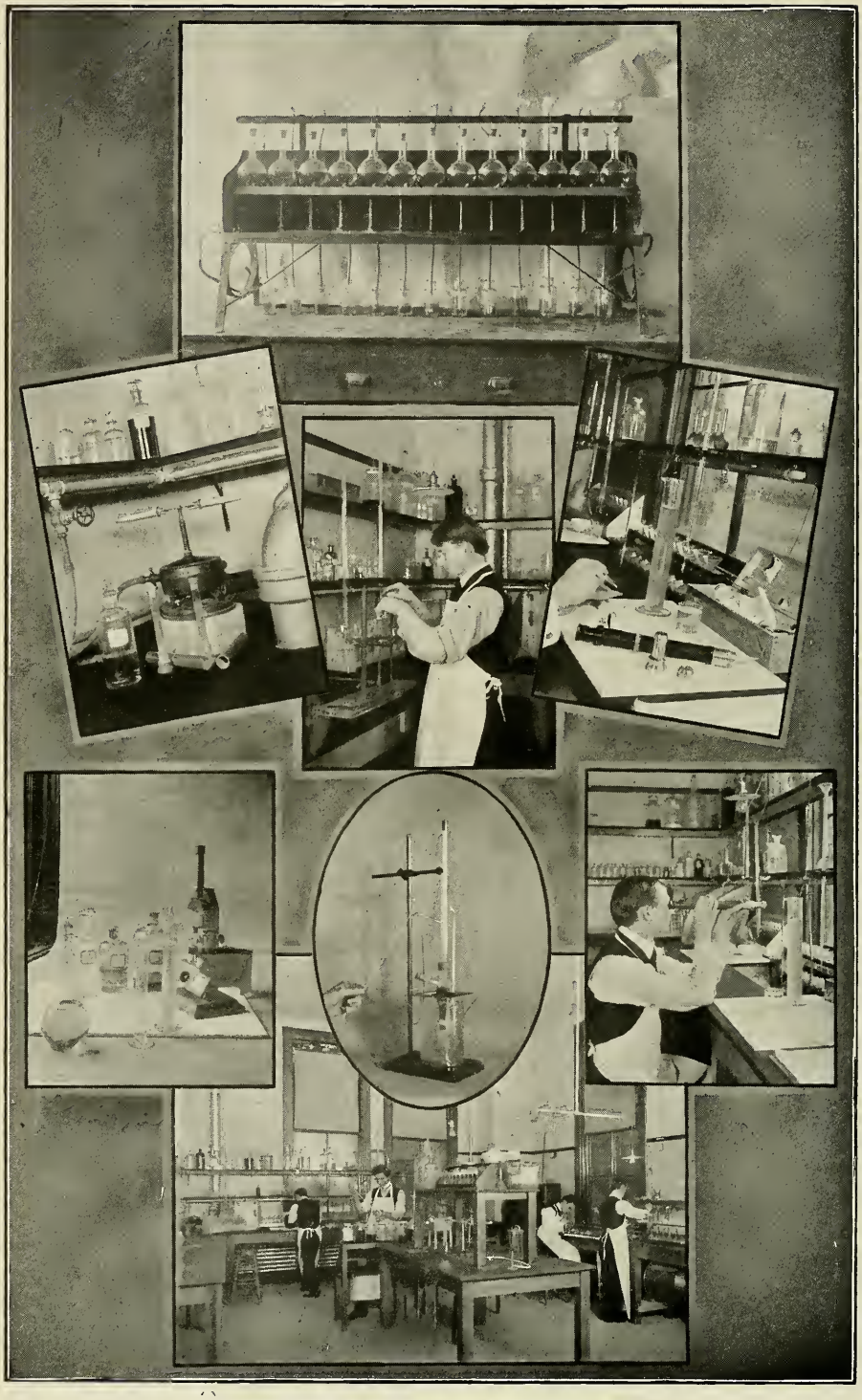
For many years special attention has been given to the graphic method in the representation of the results obtained by laboratory and clinical research in individual cases. One of the more recent and most practical applications of the method is to the study and management of cases of disturbed metabolism. While this method is applied to numerous forms of metabolic disturbance, it renders most essential service in the treatment of cases of diabetes, obesity, and the various cachexias. The accompanying graph shows the progress of the diabetic patient under treatment.

In making this graphic study of metabolism, note is taken of the following data, which is determined with great care by experts in the several methods of examination required:—

1. The amount of food sugar (calculated as glucose).
2. The amount of urinary sugar.
3. The coefficient of sugar utilization.
4. The food and urinary nitrogen.
5. The nitrogen balance and from it the tissue loss or gain.
6. The amount of acidosis (acetone and diacetic acid).

The study of metabolism has been recently much facilitated by the installation of the new respiration calorimeter devised by Doctor Benedict of the Carnegie Nutrition Laboratory at Boston. Through the courtesy of Doctor Benedict the expert in charge of this department was permitted to spend some weeks in the practical use of this ingenious and delicate apparatus in the Boston laboratory, under instruction by Doctor Benedict, and thus we are enabled to make the first application of this new method to the study and treatment of clinical cases. This apparatus is shown in the accompanying cut.

By means of the respiration calorimeter, it is now possible to study with accuracy the metabolism of starch and other carbohydrates, a matter of much interest not only in cases of diabetes, but also in cases of obesity, emaciation, and various cachexias.

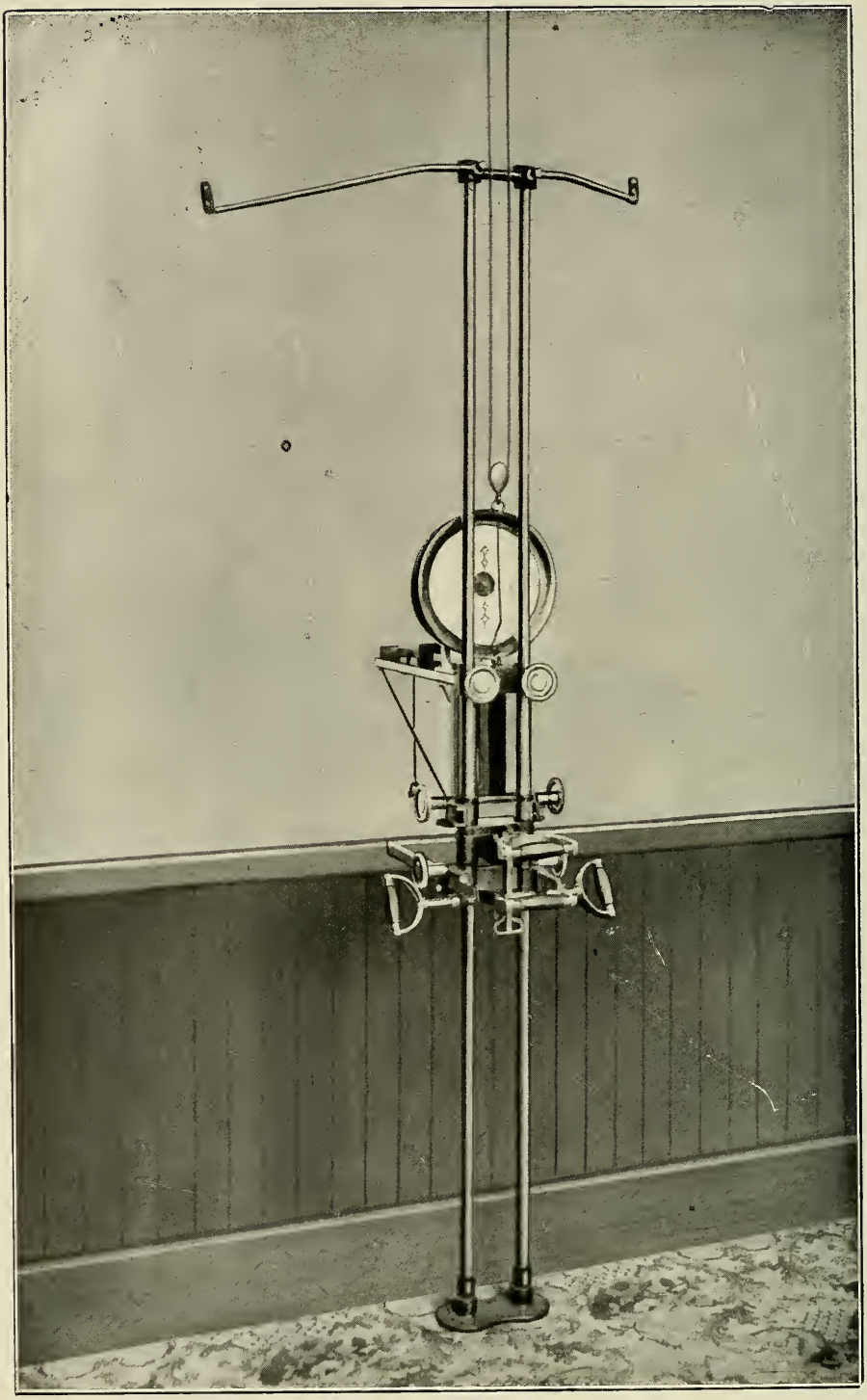


LABORATORY FOR URINARY EXAMINATION

PHYSICAL		Per cent of Av'age	Average Men	Average Women
Collected during (hrs.)			24	24
Quantity . . . . (c. c.)			1200	1100
Color			Amber	Amber
Deposit			0	0
Odor			Urinous	Urinous
Specific Gravity			1013	1012
Total Solids . . . (gm)			34.19	27.46
Freezing Point Δ			—1.31°	—1.15°
Urinary Depuration			4.175	4.200
Water Elimination			80%	80%
Renal Efficiency (Phthalein Test)				
CHEMICAL				
Ac. Terms $H_3 PO_4$ (gm)			1.00	.79
Total Nitrogen . (gm)			7.43	5.40
Urea . . . . (gm)			13.29	9.88
Uric Acid . . . (gm)			.332	.308
Ammonia . . . (gm)			.300	.295
Creatinin . . . (gm)			.96	.63
Chlorides . . . (gm)			6.89	6.93
Phosphates . . (gm)			1.75	1.17
Fixed Sulphates . ($gmSO_3$)			1.113	.776
Ethereal Sulphates ($gmSO_3$)			.132	.106
Neutral Sulphur . ($gmSO_3$)			.186	.200
Sugar . . . . (gm)			0	0
Diacetic Acid			0	0
Acetone			0	0
Albumin . . (% Vol.)			0	0
Bile			0	0
Indican			0	0
Indolacetic Acid			0	0
Urobilin			0	0

MICROSCOPICAL

Organic		Chemical
Casts . . (No. in field)		Urates
		Uric Acid Crystals
Pus Cells . (No. in field)		Calc. Oxal. Crystals
Blood Cells (No. in field)		
Spermatozoa (No. in field)		Phosphates
Epithelia	Mucus	Triple Phos. Crystals
Bacteria	Yeast Cells	Other Crystals



THE DYNAMCMETER

Anthropometric Examinations

In the office examination a careful note is taken of the condition of the patient's muscles, his general state as regards weight, etc., but the examination does not stop at this point. By means of a specially constructed dynamometer, the strength of each one of the larger groups of muscles is tested. The patient's weight is carefully determined, and various coefficients are worked out.

The physiologic method recognizes in deteriorated muscular strength both a cause and a consequence of various abnormal states, and hence undertakes to remedy this condition by means of various forms of exercise—passive, active, and active-passive.

The intelligent application of this means requires first of all a careful measurement of the patient's muscular capacity. The strength of the lungs can not be determined by testing the arms; neither can the strength of the abdominal muscles be measured by determining the strength of the grip. The strength of each of the thirty great muscular groups of the body must be determined and charted in order to get an exact picture of the sum total of the patient's muscular ability.

An attempt to accomplish this, after some years of experiment, resulted in the construction of the Universal Dynamometer, which is in use in many gymnasiums, including those of the leading universities of this country, and has been for years in use by the United States government in its military and naval schools.

The comparative study of the measurements obtained from several hundred persons rendered possible the preparation of a table of strength coefficients of considerable scientific interest.*

The Strength Graphic

The accompanying photo-reproduction of the graphic blank (see page 53) shows how the results of the dynamometer examination are made visible to the eye. Anthropometric measurements, such as are employed in scientific gymnasia, are also made in each individual case.

Examinations of 32,098 cases (Dec. 31, 1911), have been made in this department. The standard figures were of course worked out from data of healthy persons. The compilation of this data has made possible the preparation of a table showing the strength of various groups of muscles as compared with those of homologous muscles, or muscles of the opposite side in the same individual, and in average individuals of the two sexes.

For ready comparison with the normal standard the results are plotted upon the graphic blank, which is shown in reduced form. By means of this graphic record it is possible to determine at a glance the relation of the strength of any group of muscles to the normal for an individual of

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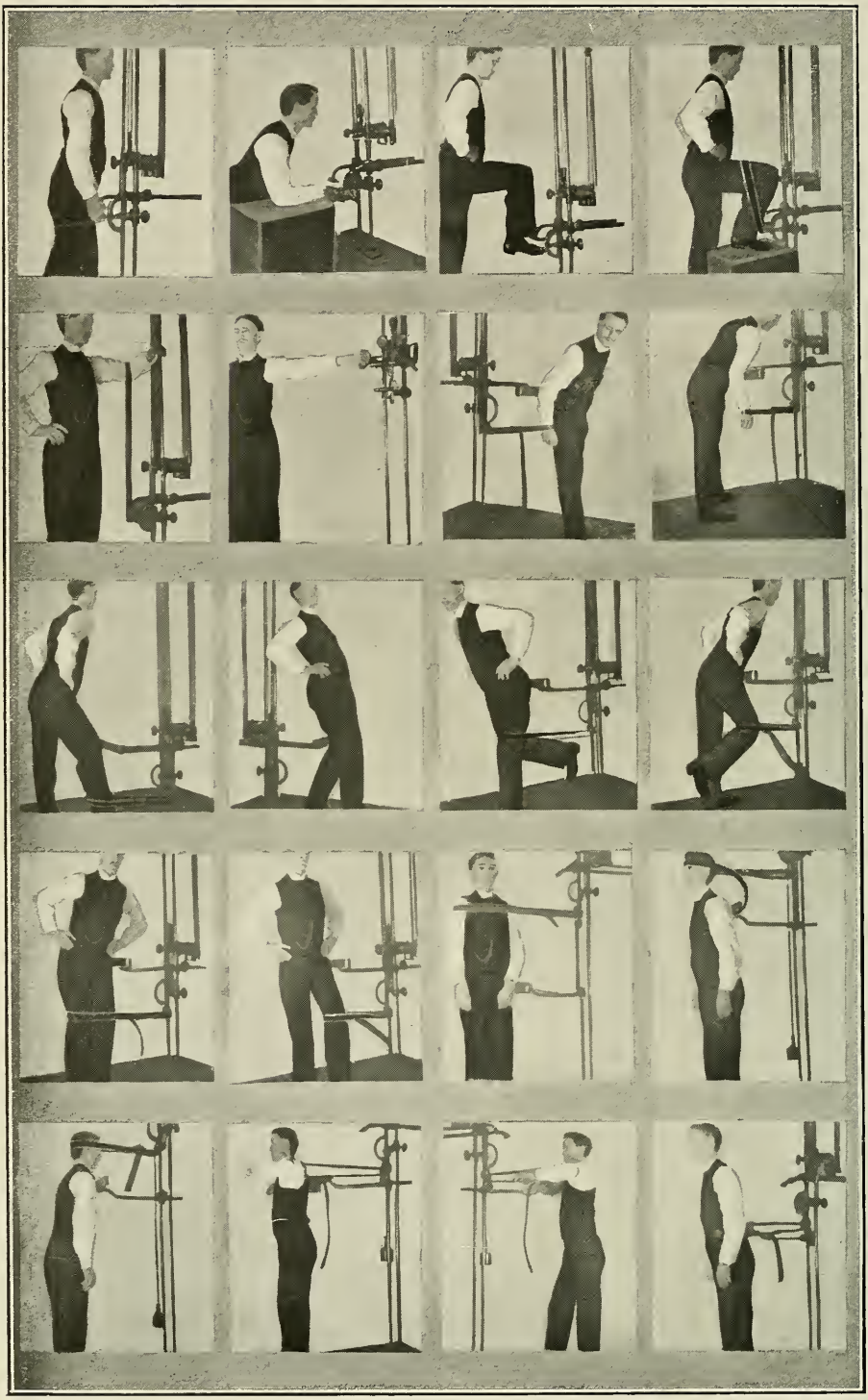
*"A New Dynamometer for Use in Anthropometry," "Physical Coefficients." *Modern Medicine,* 1895. Battle Creek, Mich.

"The Value of Strength Tests in the Prescription of Exercise." *Modern Medicine,* 1896. Battle Creek, Mich.



TESTING THE MUSCLES

STRENGTH GRAPHIC

Classified According to Heights from 58 to 67 Inches.

Arranged from the results obtained in testing the strength of the individual groups of muscles in 1552 WOMEN, by means of the Universal Dynamometer. The figures given represent the mean-average for each group of muscles respectively. Made and compiled under the direction of J. H. KELLOGG, M. D., Superintendent of the Sanitarium and Hospital, Battle Creek, Mich.

Except when Otherwise Indicated, Quantities are Expressed in Pounds Avoirdupois.

| HEIGHT (Inches). | WEIGHT. | ARMS. R. Hand Flexors. | L. Hand Flexors. | R. Hand Extensors. | L. Hand Extensors. | R. Forearm Pronators. | L. Forearm Pronators. | R. Forearm Supinators. | L. Forearm Supinators. | R. Arm Flexors. | L. Arm Flexors. | R. Arm Extensors. | L. Arm Extensors. | R. Latissimus Dorsi. | L. Latissimus Dorsi. | R. Deltoid. | L. Deltoid. | R. Pectoral. | L. Pectoral. | R. Shoulder Retractor. | L. Shoulder Retractor. | LEGS. R. Foot Flexors. | L. Foot Flexors. | R. Foot Extensors. | L. Foot Extensors. | R. Leg Flexors. | L. Leg Flexors. | R. Leg Extensors. | L. Leg Extensors. | R. Thigh Flexors. | L. Thigh Flexors. | R. Thigh Extensors. | L. Thigh Extensors. | R. Thigh Abductors. | L. Thigh Abductors. | R. Thigh Adductors. | L. Thigh Adductors. | TRUNK. Trunk Anterior. | Trunk Posterior. | Trunk R. Lateral. | Trunk L. Lateral. | Neck Anterior. | Neck Posterior. | Neck R. Lateral. | Neck L. Lateral. | RESPIRATION. Respiration - Diaphragm. | Respiration - Chest. | Spirometer (Litres). | Total Strength. ARMS. | LEGS. | TRUNK. | CHEST. | ENTIRE BODY. | COEFFICIENTS. Height-Weight. | Strength - Height. | Strength - Weight. | Respiratory-Height. | Respiratory-Weight. | Vital Efficiency. | Vital Development. | Arm Strength - Weight. | Leg Strength - Weight. | HEIGHT (Inches). |
|---|---|---

NEUROLOGICAL EXAMINATION

given height and sex, as well as the total for the legs, arms, or any other given part, or for the body as a whole.

Under training, the gain in strength, as shown by the dynamometer, is often very rapid, a gain of 500 pounds in a week being not uncommon.

The Study of the Physique

In the anthropometric examination, special note is made of the physique and the figure, the condition of such important groups of muscles as those of the back and abdomen, and the respiratory muscles. When necessary, outlines are taken of the body by means of a special device for the purpose, by which deviations from the normal type are graphically shown.

The correction of these deficiencies and deformities is essential to a permanent cure in many forms of chronic disease. A flat chest and a bulging abdomen are most always associated with intestinal catarrh, constipation, indigestion, gallstones, colon disease, appendicitis, pelvic disease, congested liver, movable kidneys, or some other pathological condition which is in part at least the result of muscular weakness or deficient development and can be permanently cured only by strengthening the weak muscles by proper exercises.

Neurological and Physiological Examinations

A careful physiological and neurological examination is essential in many cases. Such examinations may afford valuable information in a very large number of the chronic cases which come under observation in an institution like the Sanitarium. For example, neurasthenics are often greatly disturbed by paresthesias and other symptoms which do not indicate organic change of any sort, and which quickly disappear under appropriate treatment.

A great point is gained in being able to assure such persons by careful neurological and psychological tests that their brains and nerves are sound organically, and that the clamoring sensations which they experience are only the reflected complaints of disordered viscera, or the outgrowth of disturbed metabolism.

Modern neurological and psychological researches have developed a number of new methods by which the structural and functional conditions of the central nervous system may be tested. By subjecting the patient to the proper tests, it is possible to determine with accuracy the actual condition of the principal cerebral and spinal centers, and the extent of deviation from the normal standard may thus be recognized and recorded.

In these examinations the chronometer, kymograph, and various other delicate calipering and measuring devices of the psychologic laboratory are appealed to, and often with the most interesting results, showing the variations in the rate of nerve transmission, or of the recognition of impressions of various sorts, the time required for judgment or decision, the reaction time with various forms of stimuli, etc.

These tests are exceedingly valuable to the physician employing the physiologic method, in enabling him to know the ability of the patient to respond to the various powerful therapeutic agencies which are at command for utilization in his case. Hydriatic agents are like artillery; they

THE PHOTOGRAPHIC DEPARTMENT

are big guns, capable of accomplishing great good if properly aimed, but may be equally effective for mischief when used without intelligent direction.

Convenient graphic blanks representing various regions of the body are utilized in recording the pathological conditions which can be graphically represented.

The Photographic Department

An extensive photographic department is maintained, experienced photographers being constantly employed. The business of this department is to make photographs of pathological conditions when required, as an aid to the medical record, and to makke slides, photographic enlargements, and other paraphernalia for use in the school of health and other educational departments of the institution. The photographs with which this book is illustrated are the product of this department.

This department is fitted out with apparatus for making moving pictures and photographs in natural colors. It renders invaluable service also in reproducing the radiographs of the Roentgen Ray department for purposes of record and to send to physicians by whom are sent patients for examination.

Special Examinations

Thoroughgoing examinations of the bladder by means of the *cystoscope* are made in cases in which there are indications of bladder disease. Examinations are also made of the ureter and the kidneys in cases of suspected disease of these organs.

Rectoscopy is largely employed as an aid in dealing with diseased conditions of the rectum and lower colon.

The *bronchoscope* is employed when necessary for the examination of the trachea and bronchi, and for the removal of foreign bodies which find entrance to these parts.

The newly perfected *gastroscope* of Elsner is found useful as a means of diagnosis, but also permits the making of applications to the gastric mucous membrane.

The esophagoscope permits the removal of foreign bodies from all parts of the esophagus and also from the interior of the stomach.

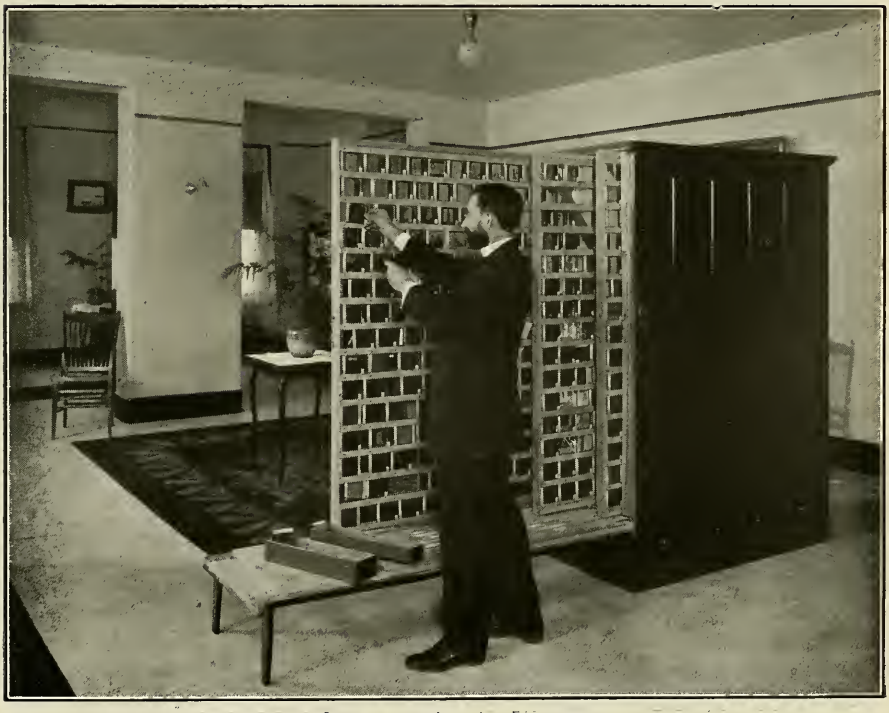
Wasserman reaction, Pirquet, and other tests for tuberculosis and all other known special tests are employed as indicated in individual cases.

DENTAL DEPARTMENT

THE DENTAL NURSE

MEN'S RECEIVING OFFICE

THE RECORD VAULT



STEREOPTICON SLIDE RACK

BATH ATTENDANTS

THE BATTLE CREEK SANITARIUM SYSTEM OF HYDROTHERAPY

THIS system of using water therapeutically has been worked out at the Battle Creek Sanitarium during nearly forty years of scientific work.

The crude but thoroughgoing methods of the original system of Priessnitz, which succeeded among the hardy mountaineers of Austrian Silesia, were much too strenuous for more delicately organized and pampered American invalids. This fact, together with the gross empiricism which characterized the use of water in the first half of the last century, when water-cures were for a time almost a fad, brought water into general disrepute as a curative means, and greatly hindered the scientific development of this invaluable agent.

Organized Hydrotherapy

The older system lacked greatly in adaptability, because of the want of means of accurate adjustment to different grades of vitality and various peculiarities of temperament. Many new methods have been devised to fill in the gaps, and have made possible a perfectly graduated course of hydriatic procedures by which the tonic effects of cold water are made available to the feeblest patient as well as the strongest.

The Battle Creek Sanitarium system of hydrotherapy gives due prominence to hot as well as to cold applications. As first introduced into this country, hydrotherapy was essentially a "cold water cure," as it was popularly called, and thousands were more or less damaged by the routine and drastic procedures of those days, while many other thousands failed to derive from hydriatic measures the benefits which they might have received under scientific management, and as a natural result the whole system fell into disrepute, and water as a curative agent acquired a bad reputation, which in uninformed quarters still clings to it.

The Battle Creek Sanitarium System for the first time correlated with the use of water in all possible forms the use of electricity, medical gymnastics, massage, dietetics, phototherapy, and all other physiologic measures of cure, by this means greatly increasing its efficiency, and constituting a practical and organized system of physiologic therapeutics in one place and under one management.

Here was first developed an organized and systematized assemblage of all known curative agents, especially those of a physical nature, in actual practical operation. Elsewhere most of the same agents may be found in use singly, and hence less effectively, and, as a result, in many cases, unsuccessfully. Here all work together in therapeutic concert, and are thus able to achieve success in cases in which less systematic and thoroughgoing therapeutic attempts have failed.

ELECTRIC LIGHT BATHS

SOUTH CORRIDOR (SECCND STORY)

NORTH CORRIDOR

MEN'S BATH DEPARTMENT

SOUTH CORRIDOR

Hydriatic Equipment

Two complete buildings are devoted to this department,—one for men, the other for women. They are both connected with the main building and with the large gymnasium by a great semi-circular corridor, the gymnasium standing between. Each of the buildings has three stories and a basement and is one hundred and forty feet long by sixty-six feet wide. The well-aired and lighted basement is devoted to rectal and bowel applications and classrooms; the first floor, to all forms of general and local hydriatic applications. At the east end is a fine swimming-pool which is maintained at a temperature of about 78 degrees F. A smaller pool has a temperature of 60 degrees F.

The Electric Light Bath

On the first floor are found the various forms of the electric-light bath,—one of the most important additions to modern therapeutics, and one of the many outgrowths of the experience of the Battle Creek Sanitarium. Here also are various sprays and douches, including several fine steam douches, by which most excellent revulsive effects can be produced, and a giant douche which pours down a perfect torrent of water at a temperature a little above 50 degrees F., thus giving a range of effects suitable to every possible case.

That hydrotherapy has won a definite and permanent place in modern rational therapeutics can no longer be questioned, and the Battle Creek Sanitarium claims recognition as the pioneer in scientific hydrotherapy among the medical institutions of this country. Here have been developed a great number of additions to the methods and technique of this invaluable therapeutic method.

Physiologic Tonics

As a tonic, cold water has no superior. The cold spinal douche often accomplishes marvelous results and in a wonderfully short space of time in certain classes of neurasthenics. The tonic sitz baths, cold mitten frictions, salt glows, towel rubs, wet sheet rubs, wet and dry packings, compresses, and full baths of various sorts, including Nauheim baths, electro-hydric baths, shallow and neutral baths, are only a few of the numerous hydriatic procedures which are daily in effective use as a part of the Battle Creek Sanitarium System.

Electro-Hydric Baths and Massage

The second floor of each of the treatment buildings is devoted chiefly to electrical baths, massage, and local applications of heat by means of the electric thermophore, the photophore, and the arc-light. A large semi-circular space is devoted to manual Swedish Movements.

The Physiologic Effects of Hydriatic Applications

In scientific hydrotherapy, every therapeutic application of water is based upon a knowledge of the physiologic effects of the given application as worked out by careful laboratory research.

NORTH CORRIDOR (SECOND STORY)

ELECTRIC LIGHT BATHS

NORTH CORRIDOR

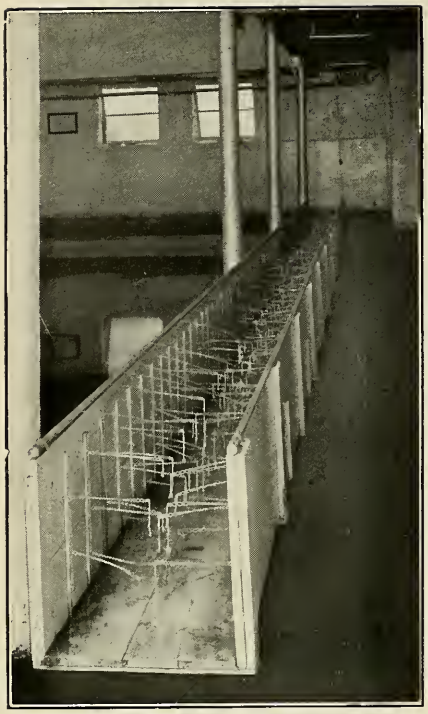
LADIES' BATH

SOUTH CORRIDOR (SECOND STORY)

These researches have shown that both heat and cold may be employed in such a way as to produce profound effects, both excitant and depressant, not only upon the skin, with which the applications are brought into direct contact, but upon every organ and function of the body. Most profound effects may be produced by suitable application, upon the heart and circulation, the absorption of oxygen by the lungs and oxidation processes in the tissues, heat production and elimination, absorption and metabolism, liver action, renal activity, gastric and intestinal secretions and motility, hematogenesis, phagocytosis, and general vital resistance. By suitable applications, either hot or cold, or hot and cold in alternation, most profound reflex effects may be produced, inducing vasodilatation or vasoconstriction in every important bodily viscus, thus exciting or depressing activity of the heart, the brain, and the spinal cord, the stomach, the intestines, the bladder, the kidneys, the uterus, or any organ the function of which it may be desired to influence.

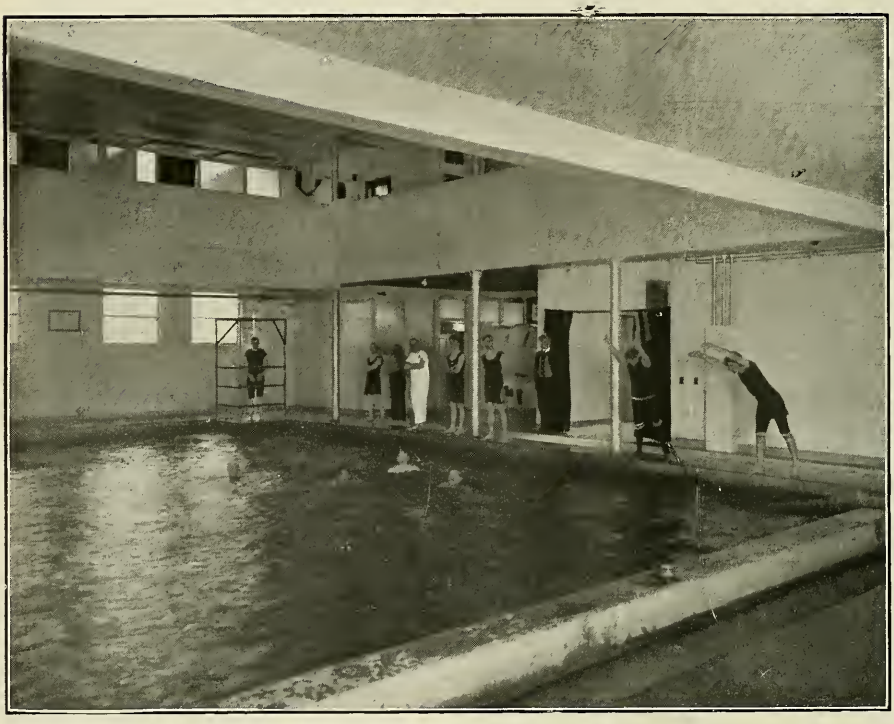
A complete description of the principles and technique of the system of hydrotherapy which has been developed and is in practical operation at the Battle Creek Sanitarium may be found in a volume entitled "Rational Hydrotherapy." This system includes more than two hundred different applications.

LOBBY OF LADIES' BATH DEPARTMENT

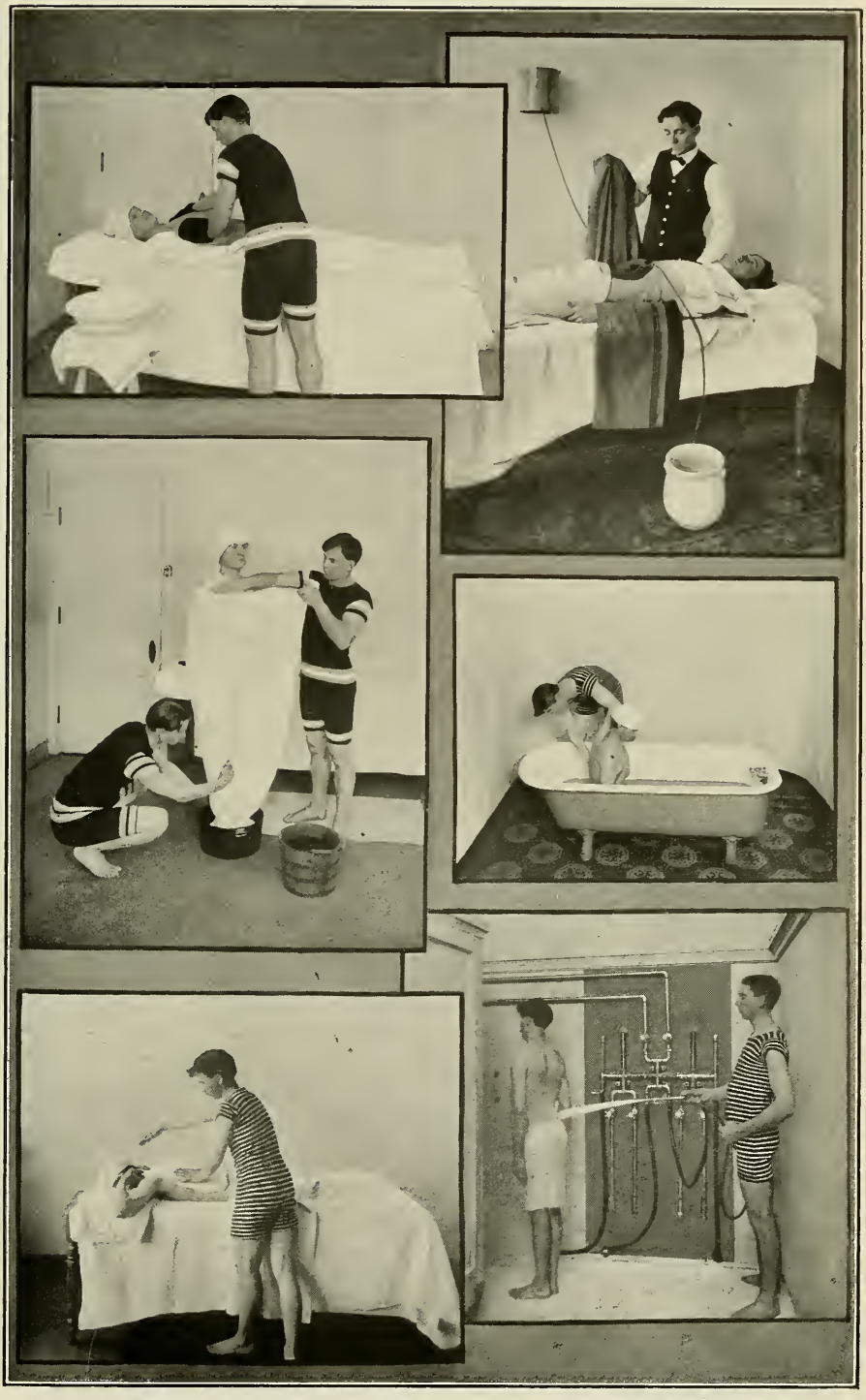


WALKING LEG BATH

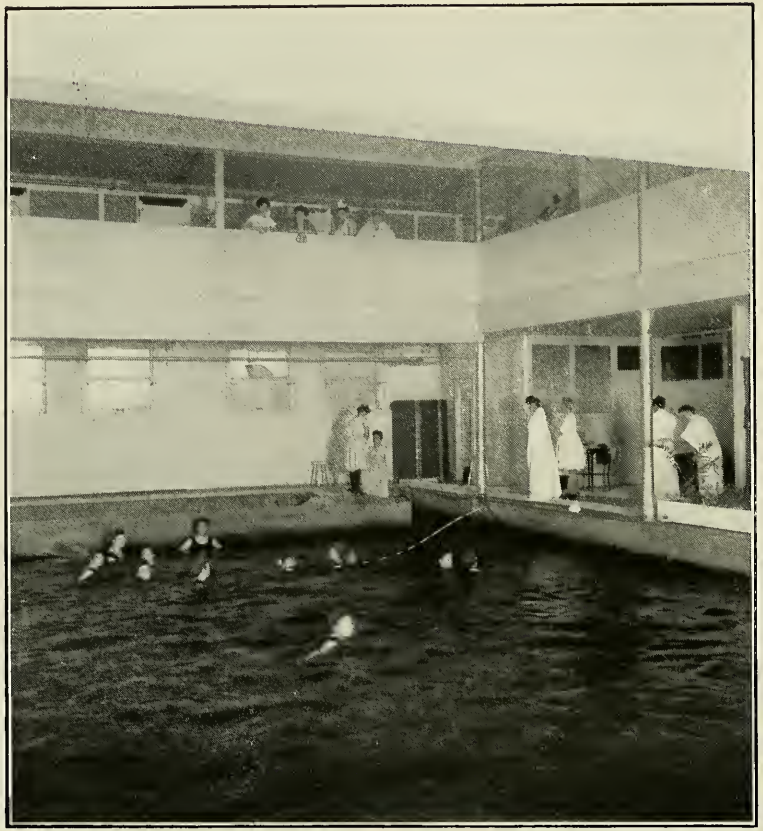
CORRIDOR IN MEN'S BATH



MEN'S SWIMMING POOL



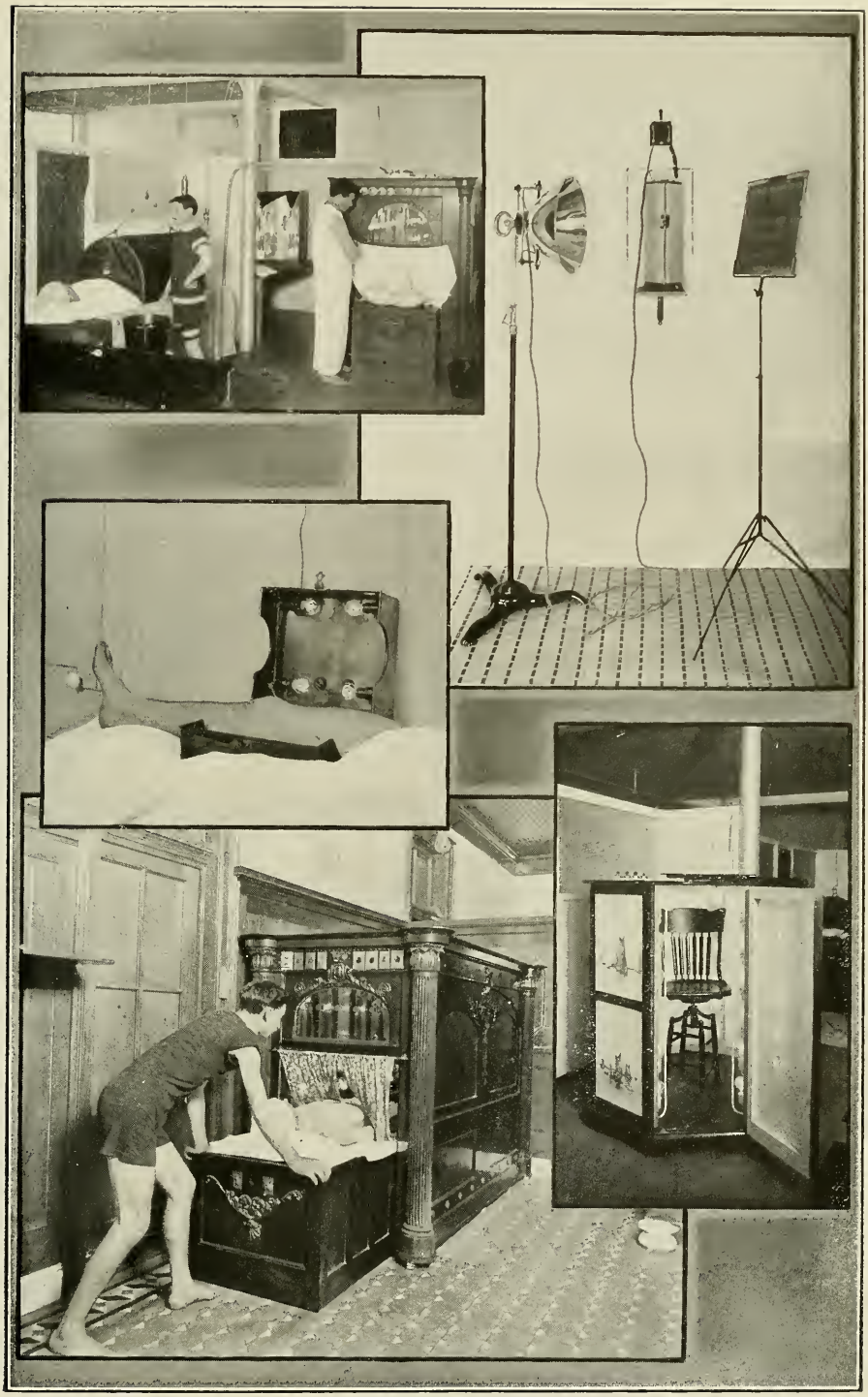
HYDRIATIC PROCEDURES



LADIES' BATH AND SWIMMING POOL

CENTRAL CORRIDOR

SOUTH CORRIDOR



PHOTOTHERAPY

THERMOTHERAPY

PHOTOTHERAPY AND THERMOTHERAPY

THIS department employs both the solar light and the electric light. In summer-time the solar light is used both direct and after filtering through a blue glass screen (to diminish its intensity when required). In winter-time the arc light is chiefly relied upon as a source for the actinic rays.

Within the last thirty years electricity has won its way to the front rank as a therapeutic agent.

The electric light is one of the most important applications in the curative art.

The electric light is applied by means of the photophore, the incandescent electric-light bath, and the arc-light bath.

Electro-thermophores of various sorts are also in use. The electro-thermophore consists of pads, compresses, or blankets in which wires are interwoven which are heated by electricity. Scores of these are in constant use.

Phototherapy

Phototherapy holds a very prominent place in the Battle Creek Sanitarium System. It is here that the incandescent light was first utilized as a therapeutic means. Here the first electric-light bath was constructed. The original model devised and still in use here has been closely followed by those who have employed this bath in various parts of the world. At the present time, this important therapeutic means is recognized and utilized by progressive therapeutists in all civilized countries. Thousands are in use in the leading hospitals and sanitariums of Europe, and the value of this bath is rapidly coming into recognition in this country.

The Actinic Ray

Most powerful chemical light effects are now obtainable by means of the quartz lamp which has recently been perfected. This light gives off almost pure chemical rays which are so highly active that it is not safe to expose the eyes to the direct action of the light. Exposure of the skin for four or five minutes produces very active photo dermitis without sensible heat effects. The actinic ray is found extremely valuable for derivative effects in applications to the chest in cases of chronic bronchitis and over the liver for relief of hepatic congestion. It is useful in many forms of skin diseases. It may be applied successfully to different portions of the skin until the whole surface of the body has been covered, as a means of permanently increasing the surface circulation. The actinic ray is also useful in various skin affections, particularly psoriasis and acne.

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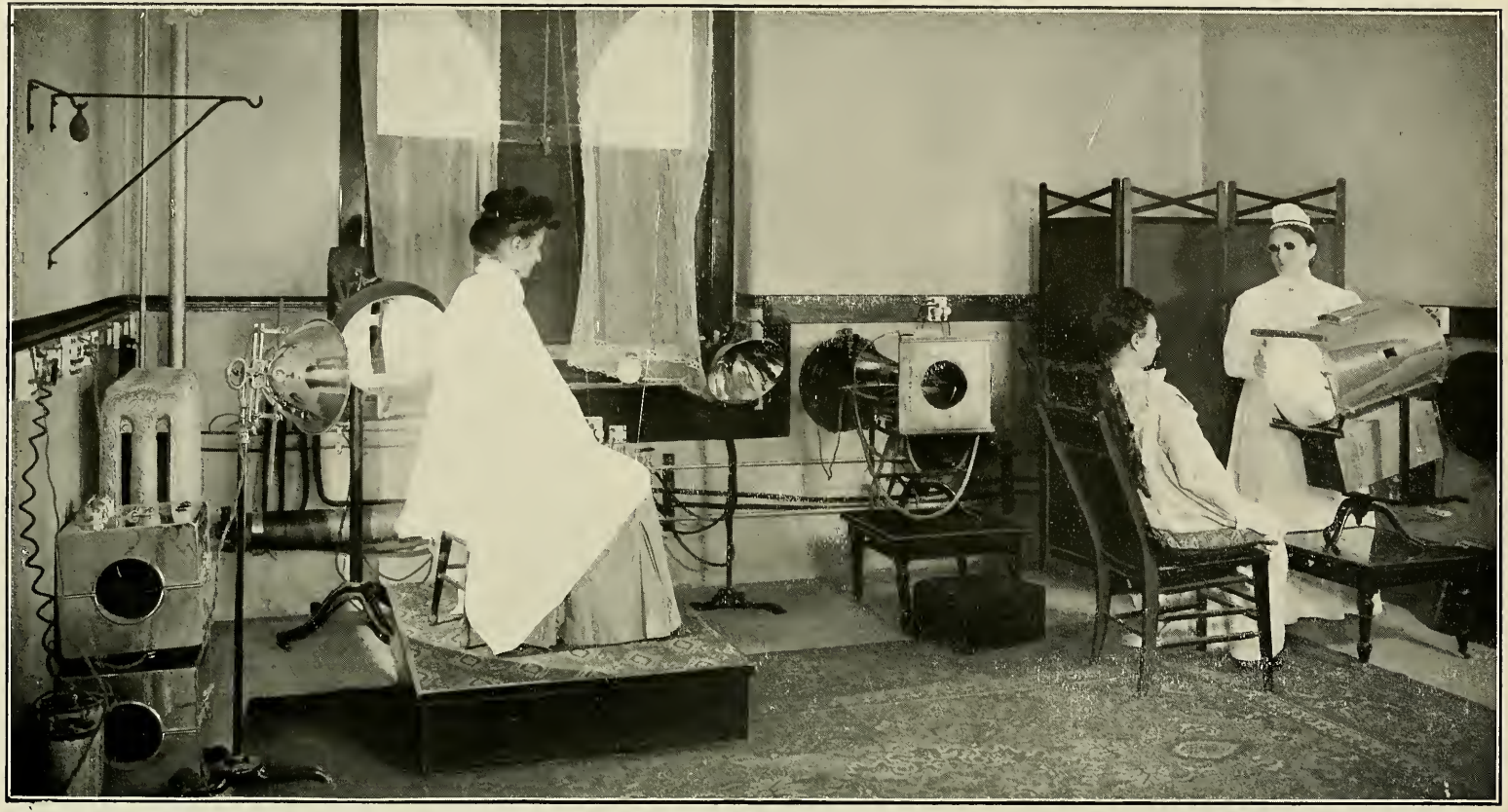
*"Phototherapy and Thermotherapy." A System of Physiological Therapeutics. Vol. IX. P. Blakiston's Sons & Co., Philadelphia, 1901. "Phototherapy in Chronic Diseases," American Electrotherapeutic Association, Sept. 13-16, 1904, St. Louis, Mo. *Archives of Physiological Therapy,* Feb., 1905.



THE ARC LIGHT DEPARTMENT

ELECTRICAL DEPARTMENT*

ELECTRICITY is not capable of accomplishing half the marvels that are claimed for it by many enthusiastic electrotherapists, but it is, nevertheless, an extremely valuable therapeutic agent, especially when utilized in connection with hydrotherapy, thermotherapy, and other physiologic methods. By itself, its usefulness is extremely limited, but in connection with other physiologic measures this agent is capable of securing most excellent results.

The Sinusoidal Current

The form of electrical current most in use here is the *sinusoidal.* This is a current, the peculiar properties of which were discovered in this institution more than twenty-five years ago and described in a scientific paper published soon after and read at a meeting of the American Medical Association.

Dr. d'Arsonval, of Paris, some years later made the same discovery, and to him is due the credit of having accurately studied and described the current and made its properties known to the world.

This current has the advantage of being painless in application, even while producing the most vigorous muscular contractions. It is employed as a means of passive exercise, especially for the development of the muscles of the back in spinal curvatures, and the muscles of the abdomen in cases of enteroptosis. It is also an excellent means of exercising paralyzed muscles when they have not reached a too advanced stage of degeneration, and furnishes a convenient method of inducing vigorous passive exercise of the muscles in cases of obesity and diabetes in which the patient is too feeble to take the requisite amount of exercise in walking or other means of muscular activity.

The *galvanic* current is largely utilized in appropriate cases; also the *faradic* current. Some of the methods employed in the use of the galvanic current it is believed are rendered more efficient by modifications which have grown out of experience in the use of this agent in this establishment, especially in connection with various hydriatic measures.

The *static* current provided by a large machine (the largest ever constructed) is found extremely useful in certain classes of cases, especially the paresthesias of neurasthenia, insomnia, and certain forms of neuralgia.

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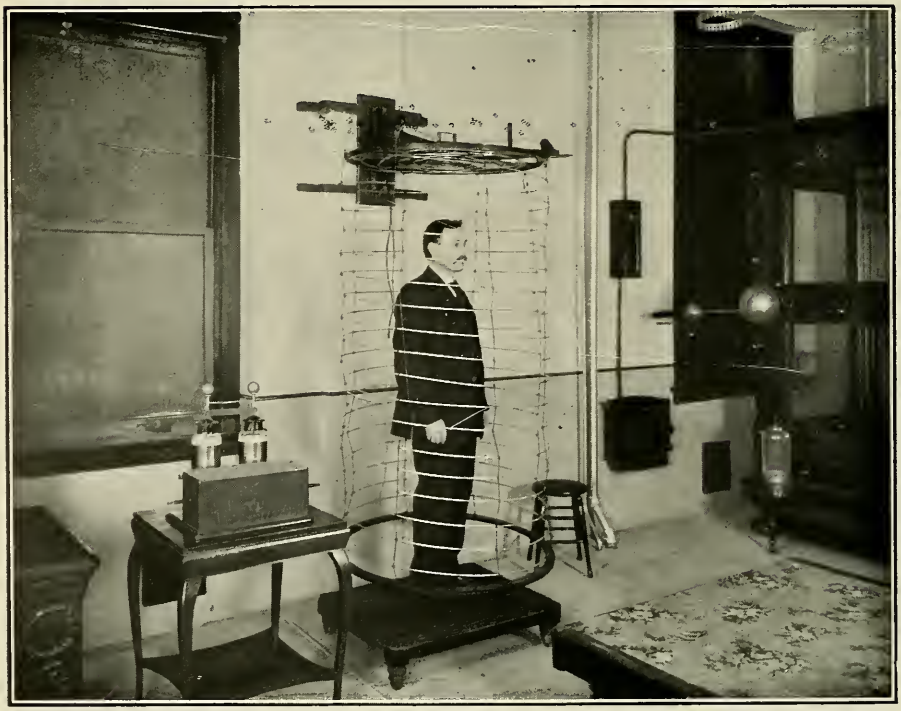
*"A Discussion of Electrotherapeutic Methods," International System of Electrotherapeutics, F. A. Davis Company, Publishers, Philadelphia, Pa.

"Electrotherapeutics in Chronic Maladies," International Electrical Congress, St. Louis, Mo., Sept. 22, 1904. *Modern Medicine,* Oct. and Nov., 1904.

"Graphic Study of Electrical Currents in Relation to Therapeutics, with Special Reference to the Sinusoidal Current." Proceedings of the American Electrotherapeutic Association, Chicago, September, 1893.



STATIC ELECTRICAL AND HIGH-FREQUENCY DEPARTMENT

The *high frequency* current is utilized in cases to which it is adapted. Although the full value of this form of electrical current is not yet clearly determined, it has certainly proved itself capable of producing some very useful therapeutic results in relieving pain and lowering blood-pressure, and in certain forms of skin disease and certain nervous affections. The apparatus for the use of these measures are the best that can be obtained in the United States or Europe, including Ruhmkorf coils and all accessory devices.

The X-Ray Department

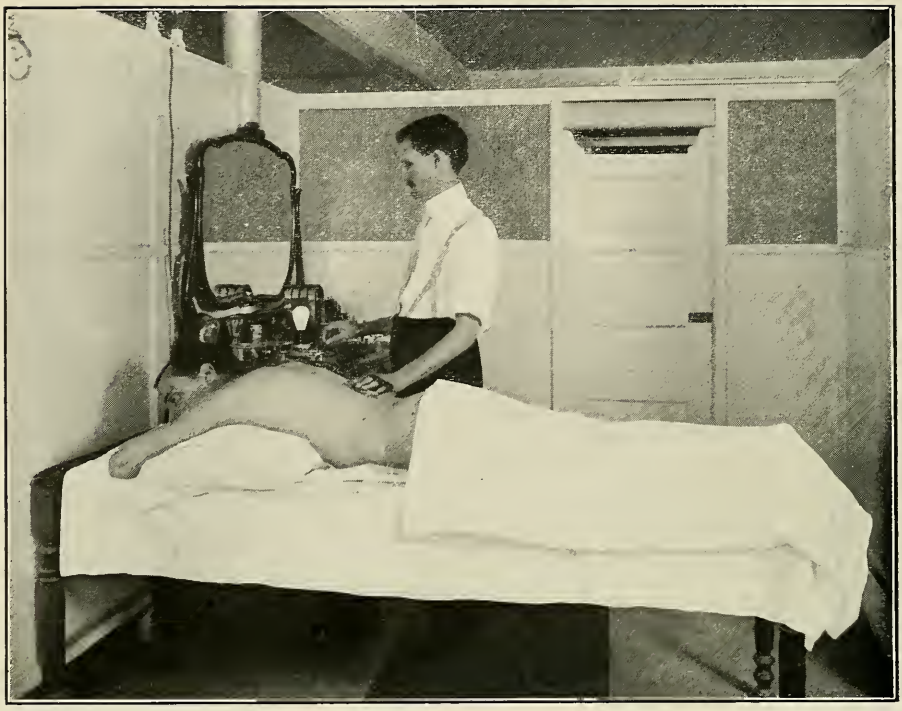
Few scientific discoveries have contributed more to the advancement of rational medicine than that of the X-ray. By means of the mysterious rays discovered by Roentgen, it is possible to obtain information concerning internal parts of the greatest value. The great attention which has been given to this subject by experts in various parts of the world has thrown important light upon a great number of internal morbid conditions which were previously most obscure and the exact diagnosis of which was often wholly impossible.

By means of the X-ray it is now possible to determine the presence and location of tumors of the brain. Cancerous growths and other diseased conditions in the bones, as well as injuries to the bones resulting from accident, and congenital defects, may now be studied with a scrutiny which in former times was possible only after death. Diseased conditions of the lungs may be shown by successful use of the X-ray long before the diseased condition is revealed by physical signs of any sort. Various morbid conditions of the heart and other internal parts, as well as the location of foreign bodies which have been swallowed, may be determined.

The Bismuth Meal

One of the most useful of all the applications of the X-ray in diagnosis is the bismuth meal. The ordinary test meal gives exceedingly valuable information concerning the digestive work of the stomach, but throws very little light upon the motility of the stomach; that is, of the action of the stomach itself upon the foods. It has come to be recognized more and more of recent years that a large measure of the disorders of the stomach are dependent upon disturbances in its muscular activity or motility. By means of the bismuth meal, the movements of the stomach as well as those of the intestine may be made visible, and the rate of movement and the digestion of foodstuffs along the alimentary canal may be actively noted.

This study has shown that the alimentary canal is divided into sections by a series of valves and folds which may be termed gates. A study of digestive orders in the light of the information which the X-ray has given us through this new means of investigation, shows that nearly all the digestive disorders are the result of trouble at one or more of these gates. In healthy digestion the food moves from one to another of the several compartments, pausing in each one until the work done in that section of the digestive apparatus is accomplished, then moving on to the next compartment. When a gate does not open promptly, stagnation of the digesting food material occurs, fermentations and putrefactions take place; the mucous membrane



APPLICATION OF SINUSODIAL ELECTRICITY

THE SINUSOIDAL BATH—ELECTRICAL GYMNASTICS

becomes diseased; autointoxication results, and various grave disorders follow. In some cases infections travel up from the lower part of the intestine to the upper part, giving rise to gall stones, ulceration of the duodenum, gastric stasis, and ulcer, and other morbid conditions. If, on the other hand, a gate is too widely open, the foodstuffs pass too quickly along the canal and digestion is incomplete.

It is evidently a matter of the utmost importance to obtain accurate information concerning the condition of each separate part of the alimentary canal, and every case of chronic indigestion should have the benefit of this thoroughgoing method of examination.

This is especially true in relation to chronic constipation, which has heretofore been one of the most baffling disorders with which physicians have had to deal. By means of the bismuth meal it is possible to locate the exact point of fecal stagnation in every case of constipation. This exact knowledge has made it possible to provide efficient remedies. These comparatively recent discoveries have made it possible to deal successfully with practically every case of indigestion and constipation, no matter how chronic the case may be or how intractable it may have been to treatment previously applied.

Use of the X-Ray in the Treatment of Internal Tumors

One of the most interesting and important advances made in recent times is the curative use of the X-ray in its application to the treatment of internal tumors. It has long been known that the X-ray is capable of producing marvelous effects in the destruction of morbid tissues. Hundreds of external cancers and other growths have been destroyed by this means, but it was applicable only to growths affecting very superficial parts. The rays could not be applied with a sufficient degree of intensity to affect deep-lying parts without producing destructive effects upon the skin, which made the remedy as bad, or even worse than the disease.

Very recently methods have been discovered by which the injury to the skin may be prevented, so that very powerful applications of the X-ray may be made to the deepest-lying parts. The application of this method to fibroid tumors of the uterus has been attended with great success. A large number of tumors, which were in some cases recognized as inoperable, have been made to disappear and patients have been definitely and premanently cured. This method does not altogether take the place of surgery, except in cases in which, because of diseases of the heart or kidneys, or for other reasons, surgical measures can not be employed, or in which the patient will not consent to the operation. Surgery, while involving somewhat greater risk, is a speedy method of effecting a cure in cases in which it is applicable. The X-ray is altogether free from risk, but is somewhat tedious, requiring repeated applications during a more or less prolonged period.

Stereoscopic Radiographs

By the aid of recent inventions it has become possible to make stereoradiographs, by means of which the exact form and location of internal parts may be seen almost as clearly as though they were not hidden within the body. The application of this new method to the stomach and intestines

has been chiefly developed in the Roentgen laboratory of this institution. In the accompanying radiographs may be seen examples of stereoradiography, the appearance of which under a carefully adjusted stereoscope will be found to be exceedingly interesting. By means of this new method great exactness in diagnosis is now possible in cases which were formerly obscure.

Thermo-Penetration, or Diathermy

This is a new application of electricity in which the electrical current is transformed into heat in the interior of the body. The apparatus consists of a device for producing rapid alternations of a low voltage current such as is used for ordinary lighting purposes. The alternations may reach a frequency as great as three million per second. No electrical effects are experienced whatever. The sensation is simply that of a glow of heat felt not upon the skin but deep in the tissues. By proper adjustment of the electrodes, the heat can be concentrated at any internal point desired. The temperature of internal parts may be raised as much as 4° or 5° F. By this means it is possible to produce the stimulating and pain-relieving effects of heat in deeply seated tissues as well as in parts lying upon or near the surface.

Diathermy is found to be specially useful in relieving the pain of sciatica, lumbago, tic douloureux, neuralgia, nervous headache, and even the terrific pains of locomotor ataxia. The pain of gout and rheumatism yields readily to its influence. Chronic pleurisy, pneumonia and asthma usually yield quickly to applications of diathermy. It is useful in obesity and aids in the removal of exudates in the pelvis and elsewhere. It has yielded excellent results in insomnia and in chronic myocarditis.

The Roentgen Cinematograph

One of the most interesting, and not least important of recent X-ray discoveries, is the perfection of a method by which X-ray representations may be made of the stomach and other internal organs at work. The installation of this important and expensive device provides the Battle Creek Sanitarium with the first apparatus of the sort which has been introduced into this country, and among the first in use anywhere. This apparatus has been especially modified for our Roentgen department and embodies important improvements which have been developed through the large experience of our laboratory in stereoradiography of the stomach and intestines. The motion picture of the stomach enables the patient to see his own stomach actually at work and enables the physician to discover slight, but very important, changes produced by disease which can not be detected in any other. It was by the aid of this method that a diagnosis was arrived at in the case of a late king of finance whose case had previously baffled the world's greatest experts in diagnosis. On an adjacent page may be seen a series of pictures representing a complete cycle of gastric movements as obtained by the Roentgen cinematograph.

GYMNASIUM

Radium

Almost the only use that has been found thus far for this remarkable substance is in the treatment of disease. The first accounts of the curative powers of radium were received with much incredulity. It seemed incredible that so great effects could be produced by so minute quantities of any substance as those employed in radium treatment. More recent studies of the subject by Von Noorden, Neusser, Gudzent and numerous other investigators have proven that both radium and the still more mysterious substance derived from it, radium emanation, are capable of producing wonderful effects upon the human body both in health and in disease.

Gottlieb noticed in 1905 that the miners working in the cold, damp radium mines of Joachimsthal were free from rheumatism and neuralgia. Dautwitz, the government physician in charge of the great radium bath establishment at Joachimsthal, confirmed this observation. Von Noorden and Falta reported in the Medizinische Klinik for January, 1911, the results of radium treatment in 75 cases, in most of which excellent results were obtained. In one case of acute rheumatism of eight days' standing the fever and swelling disappeared after the second application. His, of Gastein, reported excellent results in more than two-thirds out of 100 cases of chronic rheumatism. Dautwitz claims that a cure is accomplished in four-fifths of all the cases which come under his care at Joachimsthal.

Soupalt claims for radium emanation the cure of joint rheumatism and hydrarthrosis.

Neusser, Saake and Wilke have shown that artificial radium emanation baths have the same effects as those produced by a course of treatment at Gastein (natural radium baths).

Favorable results from radium emanation have been shown in the treatment of cases of neuralgia, rheumatism, arthritis and various forms of skin disease by Deutmann, Neusser and Bickel, Hirschwalt, Braunstein, Gager and others.

Asehoff has shown improvement in cases of pain and joint disease by radium emanation.

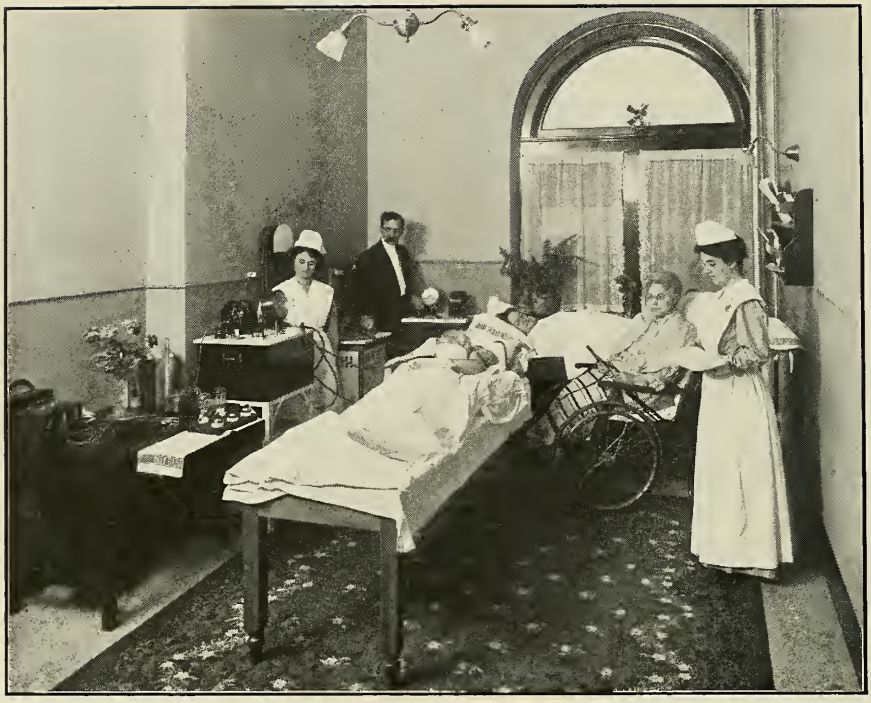
Caan has shown that radium emanation relieves pain in carcinoma and sarcoma and produces other good results.

Mendel and Frith have shown good results from the injection of radium-active water.

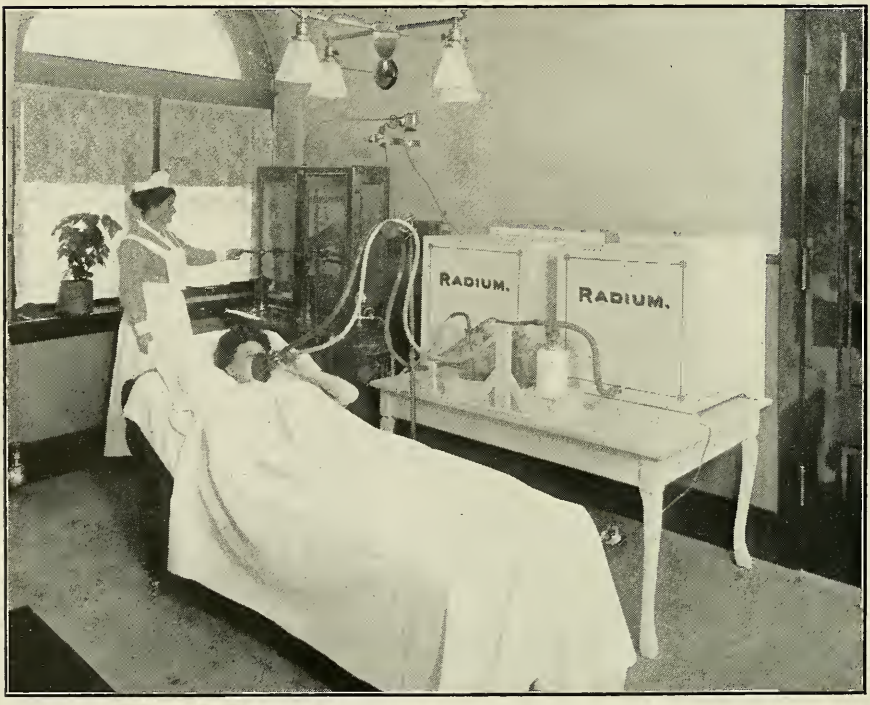
Echert reports improvement by the use of radium in solution and by injection in a case of tubercular arthritis.

Radium is employed by several different methods. 1. By the application of radium to the skin for the removal of neoplasms. 2. By imbedding radium in morbid growths. 3. By injecting solutions of radium into the diseased parts. 4. By ionization in which the radium is carried into the tissues by an electrical current. 5. By taking internally solutions of radium or radium emanation. 6. By means of baths in radium-containing water. 7. By the inhalation of radium emanation (Niton).

The inhalation of the radium emanation, especially in connection with the use of radium solutions internally, is the method which promises the best results in cases in which general constitutional effects are desired, as in rheumatism, obesity, arteriosclerosis, neurasthenia and insomnia.



APPLICATION OF DIATHERMY



ADMINISTRATION OF RADIUM EMANATION

The effects of radium are believed to be produced chiefly through its influence upon the metabolic and other ferments of the body. Experiments of Gudzent and others have shown that most of the body ferments are to a remarkable degree activated by radium emanation. By activating the uricolytic ferment it increases the solubility of the uric acid and so promotes its elimination from the body. By activating other metabolic ferments it stimulates all the nutritive functions and particularly the burning up of waste substances and tissue toxins.

The apparatus shown in the accompanying illustration has been specially made for use in the radium department of the institution and embodies certain improvements which are believed to be a very great advantage. In two particulars especially, this apparatus is believed to be superior to that which has been heretofore in use: 1. In the complete and perfect purification of the air; and, 2. In the combined use of static electricity, by means of which the body is negatively charged, so that the positive particles of the inhaled radium emanation are retained within the body, thus increasing their effects.

Clinical Results of Radium Treatment

The British Medical Journal, the Münchener Medizinische Wochenschrift, and other leading medical periodicals are constantly publishing new evidence of the wonderful curative power of radium.

Doctor Grin recently reported in the Münchener Medizinische Wochenschrift, No. 52, 1911, two cases of Bright's disease in which, through the use of radium, the quantity of urine was more than doubled. A very marked diuretic effect was apparent almost immediately after beginning the use of radium emanation solution, and the maximum effect was reached within two weeks.

Armstrong, a member of the Royal College of Surgeons of England, reports the results of the use of radium emanation in over 400 cases. Among the most notable effects observed were decrease of sugar in diabetes, decrease of albumin with lowering of blood-pressure and increased elimination of waste products in Bright's disease, lowering of blood-pressure in arteriosclerosis from 20 to 80 points, rapid decrease of pain and elimination of uric acid in gout, relief of pain and stiffness in rheumatism, rapid improvement in neuritis and arthritis, extraordinarily rapid and complete beneficial effects in neurasthenia.

Like results are reported by Strassburger, of the University of Breslau, by Doctor Dautwitz, of Joachimsthal, and by Falta, Freund, Von Noorden, and others, of Vienna.

Aero-Therapy and the Hot Air Douche

By means of an apparatus designed for the purpose, air in the form of a douche may be employed. Any desired degree of temperature may be used; hot or cold, or hot and cold in alternation.

This remedy is found very valuable as a means of relieving painful joints and the pain of sciatica and as a means of producing various powerful derivative effects through induced hyperemia of the skin.

Cases have been reported in which gouty nodules were absorbed under its use.

MORNING CLASS IN CALISTHENICS

PHYSICAL TRAINING

HEALTH winning by means of exercise occupies a very important place among the Battle Creek Sanitarium methods. Most women and a large proportion of the men who visit the institution are suffering from deficient development of the muscles, particularly the abdominal muscles.

As a result of weakness of the muscles of the abdomen, there is prolapse of the viscera, and a lessening of intra-abdominal pressure, which permits an overdue accumulation of blood in the abdomen, to the detriment both of the abdominal viscera and the body in general.

The stomach, liver, bowels, and other organs contain an excess of blood, while the spinal cord, brain, and lungs are deprived of the blood needed for their proper functioning.

The excess of blood which accumulates in the abdomen, stagnating, loses its oxygen and becomes charged with toxins, and the bacteria which flourish in the alimentary tract, especially in the colon, give rise to infections of the colon, appendix, gall-bladder, and even more remote organs.

The overwhelming quantity of toxins poured into the blood gives rise to cirrhosis of the liver, degenerative changes in the kidneys, arteriosclerosis, and other maladies. It is believed that to this chronic autointoxication may be traced a large share of the chronic ailments from which men and women suffer and die.

Exercise is one of the most important means by which this condition can be corrected. When the abdomen and other trunk muscles can be properly developed, so that the bowels are held up in place and the vessels of the great splanchnic area receive proper support, a fundamental cause of a multitude of human maladies and miseries is permanently removed.

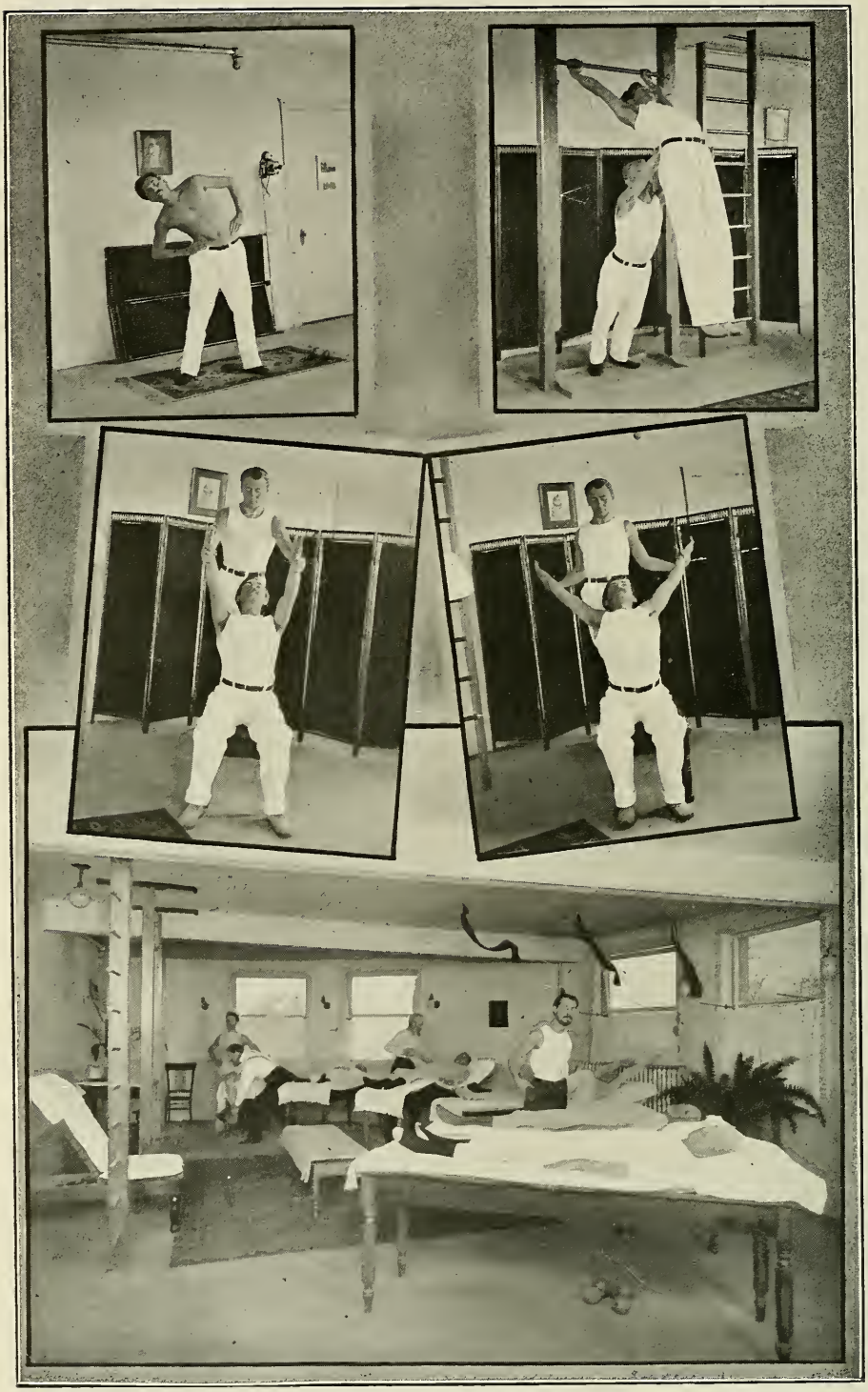
The part which the congested condition of the viscera plays in the production of functional, nerve, and mental disorders has been well shown by many observers, and has been here demonstrated in hundreds of cases in the restoration to health of chronic sufferers who apparently could be relieved by no other means.

The methods employed in this department are not gymnastic only, but involve the correction of faulty dress, faulty habits in sitting, standing, walking, etc., by means of daily drills.

The Sanitarium Chair

As soon as the patient arrives at the Battle Creek Sanitarium, his training begins. He is made to sit erect, with the chest high and the abdominal muscles drawn in, by being provided with chairs in which he is enabled to sit erect without effort. The Sanitarium health chair supports the center of the back so that the chest is held erect.

In the gymnasium the patient is taught to stand correctly, with the chest held high, the chin drawn in, the hips held back, and the abdominal muscles tense. In this position he takes various exercises with the arms,



MEDICAL GYMNASTICS

limbs, and trunk, until the muscles of the back are so strengthened that they are able to hold the body in correct position.

For those in whom the muscles are so attenuated that the desired result can not be accomplished by gymnastic exercises, manual Swedish movements and the sinusoidal electrical current are called upon to accomplish the first stages of the cure.

It is exceedingly interesting to note the rapidity with which the muscles acquire strength and vigor when a variety of means for improving their condition are set in operation and applied several times daily in an effective manner. An application once or twice a week amounts to almost

THE SANITARIUM CHAIR

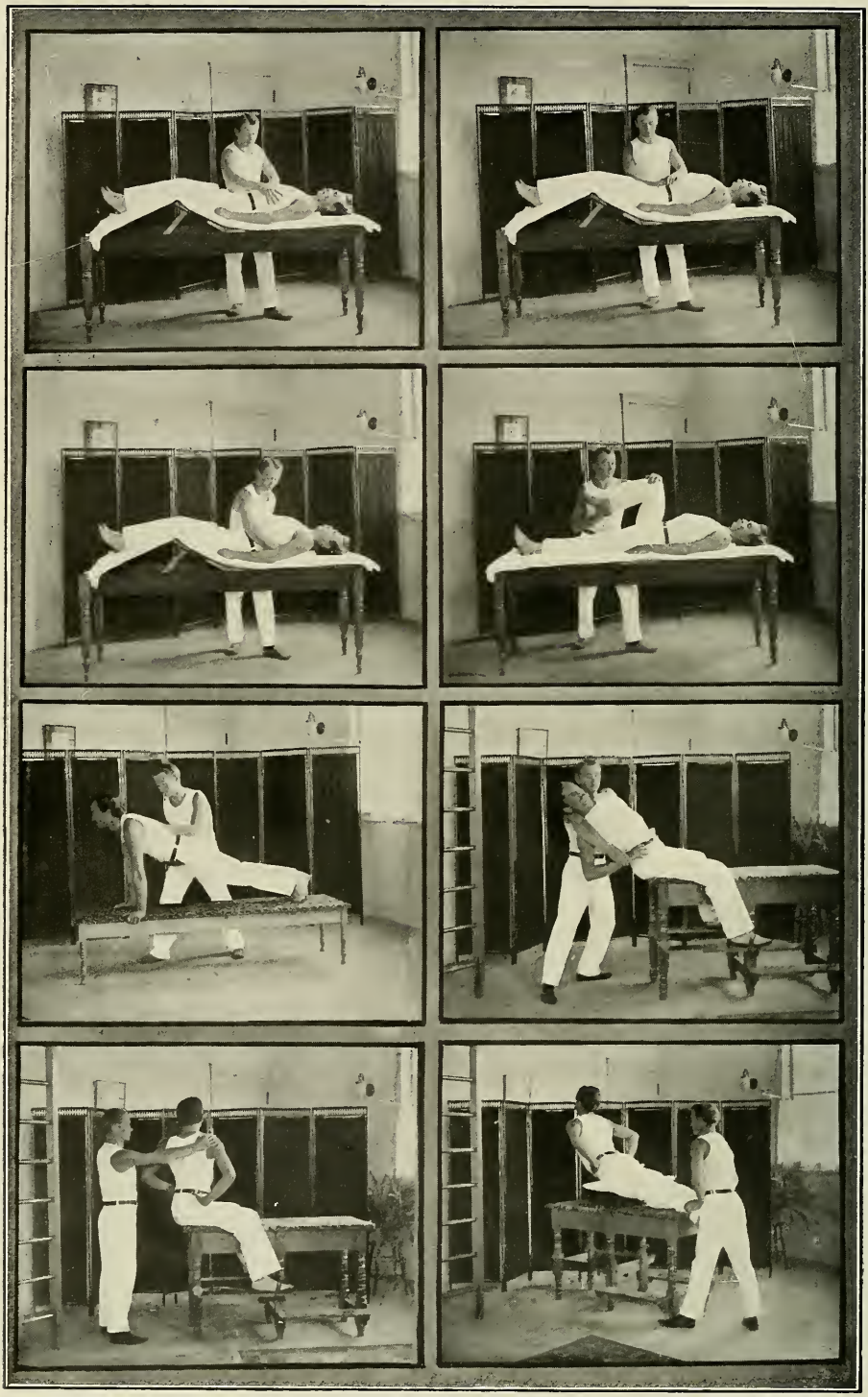
nothing in the direction of development. The applications must be short, efficient, and frequently repeated; that is, several times each day.

Swimming

Patients are encouraged to learn to swim, not only for the tonic effect of the swimming bath and the aid to respiration and circulation, but especially for the purpose of strengthening the trunk muscles and thus restoring the normal tone of the walls of the abdomen, and the intra-abdominal pressure, upon which the proper distribution of the blood throughout the body is almost as much dependent as upon the movements of the heart.

The Exercise Prescription

The accompanying cut will give something of an idea of how these various measures are put in operation to accomplish the desired end. Careful examination of the program for the invalid's day will show how



large a part gymnastics play in this therapeutic system. Nothing is left to whim or fancy, and no prescription for exercise is made until the patient's strength has been thoroughly tested and his chart has been made out. With this before him, the physician or physical director assigns work which is suited to each case. The exercises taken in general classes are of such a character as to be suited to nearly all. In addition to this, individual work is marked out which is chiefly depended upon for corrective development.

There are special exercise classes for feeble patients, and the very feeblest are visited in their rooms. Even bedridden patients, not excluding the convalescents of the surgical ward, are visited several times daily and directed in taking various deep-breathing movements which are especially adapted to their individual cases.

The exercise taken before and after breakfast, after dinner, and after supper in the evening, are especially designed to aid digestion by promoting the movement of blood through the abdominal viscera and preventing congestion or stasis in this region.

Manual Swedish Movements or Medical Gymnastics

More than one hundred years ago Ling, of Sweden, by the study of a French translation of an ancient Chinese book, became acquainted with some methods employed from ancient times by the Chinese in training soldiers for war. Taking the Chinese system as a foundation, he developed the most scientific system of gymnastics which the world knows anything about.

Ling, who was an officer in the Swedish army, succeeded in getting his system adopted by the Swedish government, which erected a large building for purpose of instruction; and now for three-quarters of a century this method has been in use not only in the Swedish army, but in the public schools of Sweden, and has resulted in the development of a magnificent race of men and women. Any traveler who has visited Stockholm must have been struck by the remarkably large number of fine, athletic-looking men whom he met upon the streets. It is almost impossible to find a Swede who is not an athlete.

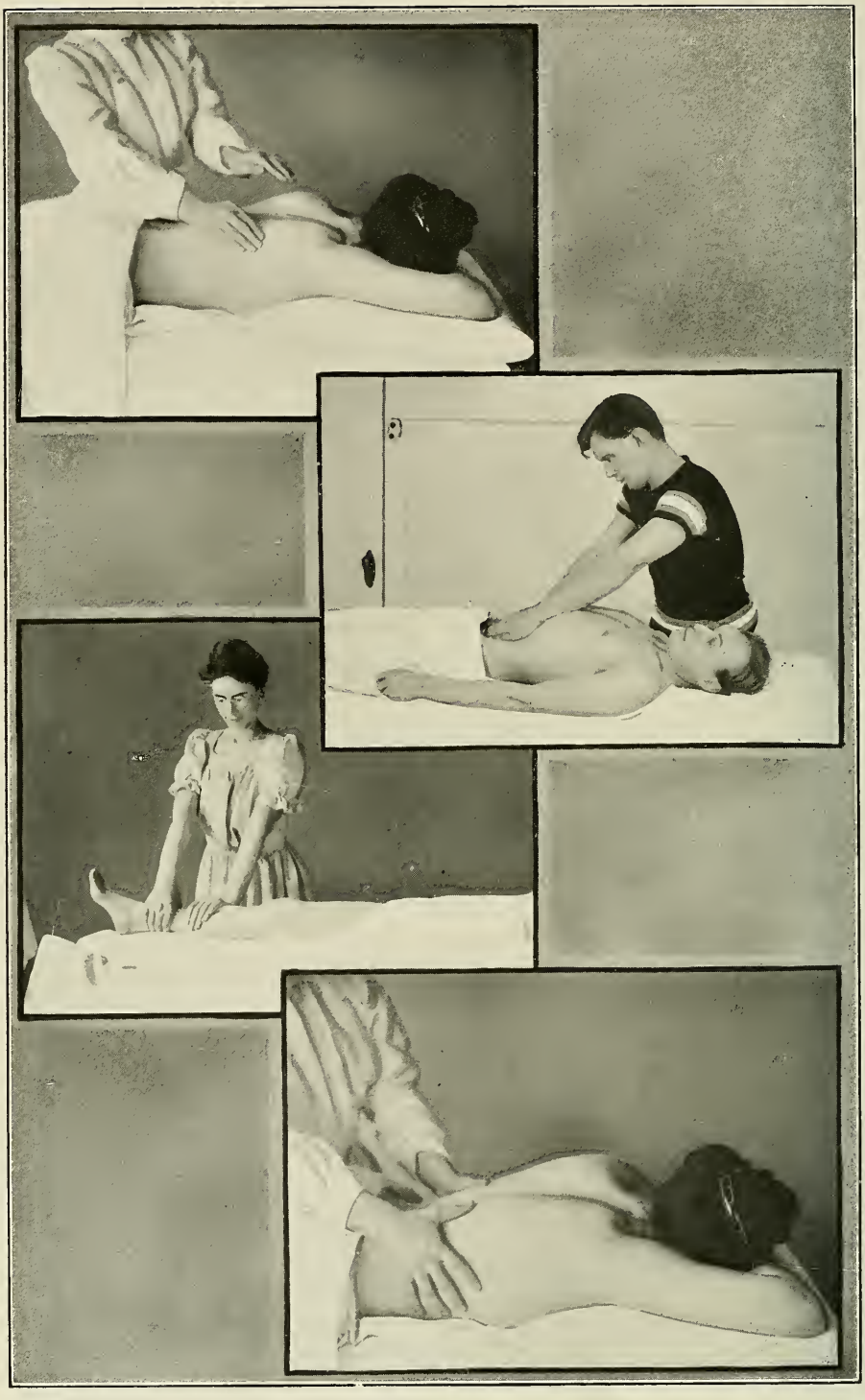
Every officer in the Swedish army is required to have a practical knowledge of the medical Swedish gymnastics, or the so-called manual Swedish movements.

The system has been in use at the Battle Creek Sanitarium for many years. Nearly thirty years ago a physician was sent to Stockholm to become acquainted with the system, and trained Swedish experts were brought to the institution to assist in introducing it. Recently this system has been rapidly growing in favor in this country under various names other than its own. So-called osteopathy is a modification of the Swedish system which has yet to demonstrate its superiority, or its claim to be called a system or a new scientific method.

This department is under charge of a physician trained in Sweden.

Swedish Gymnastics For Women

The Swedish method is especially valuable for the treatment of men and women suffering from sedentary habits. It affords the most satis-



MASSAGE

factory and efficient means known for developing the abdominal muscles of the trunk, especially in connection with the use of electricity and hydrotherapy; and, with special breathing exercises and abdominal movements, produces a most highly beneficial effect upon the abdominal viscera, relieving stasis, emptying the stomach, liver, and other viscera of stagnating blood, and thus improving functional activity.

The accompanying cuts show some of the movements which are found most valuable in connection with the numerous other physiologic measures employed in the Sanitarium system.

The manual Swedish movement comprises an extensive and almost endless variety of most carefully and accurately graduated exercises; some passive, others active, and still others active-passive. These are arranged in graduated series, known as "day's orders," which represents the work for one day. Each day the patient makes a little progress, though very feeble patients may not be able to execute the whole order the first day the treatment is given. Special attention is given to deep-breathing exercises.

Day's Order for a Person Suffering from Enteroptosis

Here is a sample "day's order" for a patient suffering from enteroptosis, the first of a series of ten:—

In executing the following Day's Orders, a breathing exercise should be taken before each movement. During each movement the chest should be held high, and the breath should be forced out by strong contractions of the abdominal muscles.

NUTRITIVE

Day's Order No. 1.

1. Breathing Exercise Series 1, Exercise *1*—Abdominal kneading.
2. Breathing Exercise Series 1, Exercise *2*—Prone lying, spinal-column-hacking.
3. Breathing Exercise Series 1, Exercise *3*—Lying, foot rolling.
4. Breathing Exercise Series 1, Exercise *4*—Lying, arm-sidewise-extended, arm-shaking.
5. Breathing Exercise Series 1, Exercise *5*—Lying, legs-nerve-pressing.
6. Breathing Exercise Series 1, Exercise *6*—Crook-lying, vibration under left ribs, percussion over ribs.
7. Breathing Exercise Series 1, Exercise *7*—Prone-lying, sacrum-beating.
8. Breathing Exercise Series 1, Exercise *8*—Lying, leg-shaking.
9. Breathing Exercise Series 1, Exercise *9*—Lying, nerve-compression-abdominal-sympathetic.
10. Breathing Exercise Series 1, Exercise *10*—Lying, head-tapping and stroking.

BREATHING EXERCISES

Series I, Lying; Series II, Sitting; Series III, Standing.

The following exercises are to be taken in each of the positions, lying, sitting and standing. The patients who are to take these exercises should be instructed to practise breathing lying upon the face for at least fifteen

METHOD OF TAKING THE CORRECT STANDING AND SITTING POSITIONS

minutes, three times a day, and to adopt the practice of sleeping in the prone position (on the face).

SERIES I.

1. Full Breathing. Take slow, deep inspiration through the nose, expanding the whole trunk, complete the prolonged expiration through compressed lips. (20.)

2. Abdominal Breathing. Chest high, hands on hips, thumbs to rear. Contract abdominal muscles with strong expiratory effort; press hard with thumbs upon the lower back to hold chest up during expiration. (10.)

3. Assisted Abdominal Breathing. Chest high, hands holding abdomen, deep abdominal breathing. (2), (10.)

4. Chest Lifting. After complete expiration, close throat and lift chest high as possible, followed by full breathing. (1), (2, 5.)

5. Chest Lifting, Arms Raising. Chest high, deep abdominal breathing (2), arms raised above head. (10.)

6. Chest Lifting, Arms Circumduction. Chest high, deep abdominal breathing (1), arms circumduction. (10.)

7. Chest Lifting, Feet Extension. Chest high, deep abdominal breathing (2), arms raising and feet extension. (10.)

8. Chest Lifting, Arms Raising, Feet Extension. Chest high, deep abdominal breathing (2), arms raising and feet extension (10).

9. Chest Lifting, Swimming. Chest high, deep abdominal breathing (2), swimming movements with arms (10).

10. Chest Lifting, Swimming. Chest high, deep abdominal breathing (2), swimming movements arms and legs (10).

SERIES II.

Execute the above movements in the sitting position as above described in section 10, in which knee-raising is substituted for leg movements.

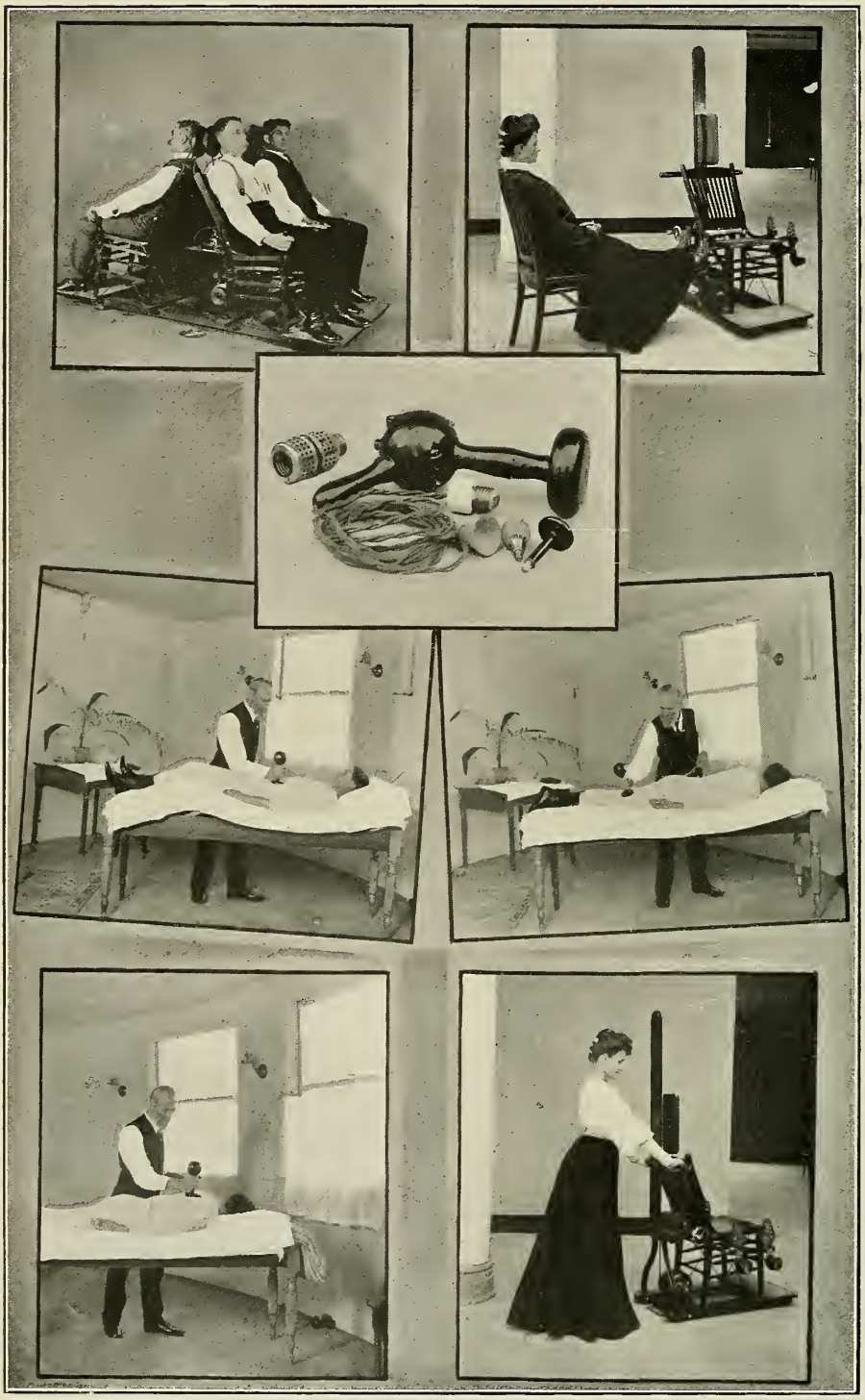
SERIES III.

Execute the above movements in the standing position as described with exception of seven and eight, in which walking on the toes is substituted for feet extension.

The standing position taken in breathing exercises should be: Heels and hips against a wall, door-jamb, or the edge of a door, the chest being held forward as far as possible without losing the balance.

Mechanotherapy or Mechanical Exercise

Certain forms of passive exercise may be administered by machinery far more effectively than by the hand. This is particularly true of vibratory exercise. The rapid, steady, and prolonged vibratory movements which can be administered by machinery can not be even approximated in efficiency by the human hand. Certain kneading and percussion movements may be administered more effectively by mechanical means than by the manual method.



MECHANOTHERAPY—VIBROTHERAPY

For more than thirty years this method has been employed in the Battle Creek Sanitarium, and the apparatus found in this department represents the perfected result of these many years' experience, having been specially constructed for this use. For more than twenty years the institution has maintained a fully equipped machine shop, which has been largely occupied with the work of developing and manufacturing the special apparatus employed in this and other departments.

Various series of graduated movements are prepared for different maladies and conditions, as obesity, constipation, neurasthenia, cardiac cases, etc.

Vibrotherapy

This mode of passive exercise, certain phases of which have recently been so extensively exploited throughout the country, has been in use as a part of the Battle Creek Sanitarium System for more than forty years. This department is represented by special vibrators for the hands and arms, vibrators for the feet, vibrating stools, vibrating tables, the vibrating chair, and sets of vibrating chairs in which several patients may be treated at once.

So many absurd claims have been made for vibrotherapy that doubts will naturally arise in the minds of many physicians respecting its actual value. Experience, however, has demonstrated its efficiency in the accomplishment of certain things.

Each of the three forms of vibration—percutient, lateral, and centrifugal—produces characteristic effects which have been studied by Vigoroux, Mortimer Granville, Schiff, Boudet, and other investigators; and it has been shown that this measure is capable of increasing or diminishing nervous sensibility. It may produce fatigue, as does muscular work; or may abolish the sense of fatigue by stimulation of the spinal centers. Applied to the head it may produce drowsiness, and even sleep. Applied to the muscles it may produce contraction or relaxation. It may produce vasomotor changes in the viscera, and even raise and lower blood-pressure. A thorough discussion of rational vibrotherapy, its physiologic effects and therapeutic indications, will be found in medical papers appearing elsewhere.*

Mechanical Massage

The vigorous, steady rhythm of mechanical massage and its never-tiring thoroughness are qualities which secure splendid results not to be obtained by manual means. The various forms of kneaders employed adapt this method not only to the abdomen, but to all the fleshy parts of the body.

Patients often express themselves as feeling that they get more immediate return from the treatment in this department than any other. The neurasthenic who suffers from cold hands and feet finds his extremities glowing with warmth after a few moments' application of hand and foot vibration. The vasomotor spasm has been broken by the rapid mechanical

*See *Modern Medicine* for 1908. Good Health Publishing Co., Battle Creek, Mich.

MECHANOTHERAPY

movement. The improved distribution of blood relieves congestion of the brain and spinal cord, as well as the general visceral stasis; and a sense of well-being, comfort and relief gives place to the depression, nervousness, confusion, and general discomfort which are the natural result of a disordered condition of the circulation.

A great share of the aches and indefinable distresses from which neurasthenics suffer are generally temporarily relieved, and often in a manner which seems almost magical.

The effects which can be obtained by this method must not be judged by the disappointing results produced from the use of various trinkets which are hawked about the country under the name of vibrators, few of which are sufficiently effective to produce any definite results whatever.

Other useful devices for the employment of mechanotherapy which may be mentioned are the following:

The Riding Horse, of which two styles are in use, one of which is a very excellent imitation of the single-foot, while the other is a very perfect simulation of the English trot.

The Camel—A device which produces a peculiar rolling motion characteristic of the camel's gait.

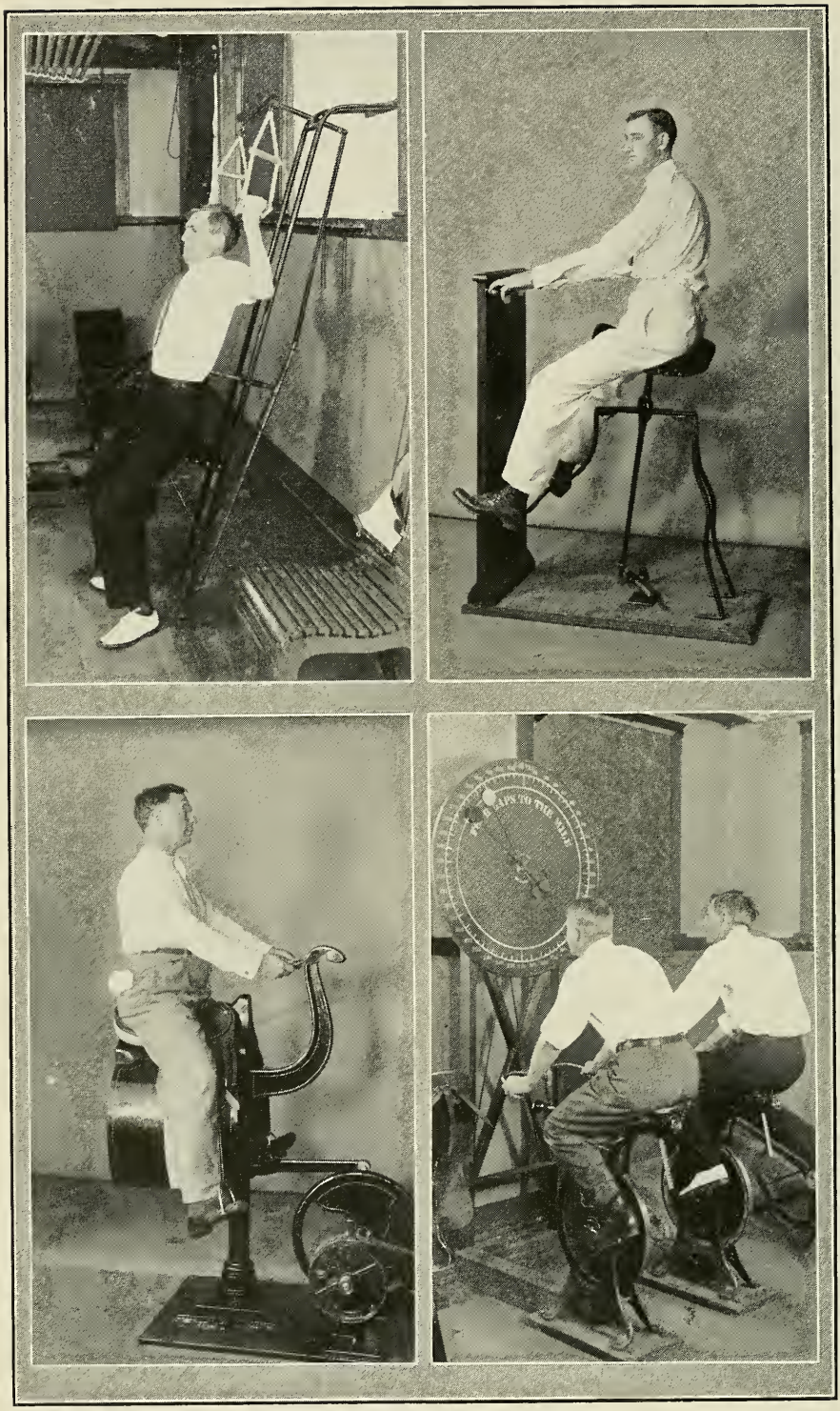
Mechanical Massage of the Back—An ingenious arrangement by which kneading movements are applied to the back. Very effective as a means of stimulating the development of the muscles of the back, and producing an excellent derivative effect in relation to the internal viscera.

Percussion Massage—An apparatus for applying light percussion, very closely imitating certain forms of percussion movements which may be applied by the hands. The mechanical percussion is even more effective than that of the hands, and is uniform and steady. The force of the percussion movements may be very easily adjusted. An excellent application for the shoulders, chest, and back.

Rotary Massage of the Abdomen—An apparatus which applies a rotary kneading movement to the abdomen in a circular manner. An excellent means of relieving constipation.

The Ergograph—A device by means of which the actual amount of work done is measured and recorded for special use in cases in which a specific amount is necessary, as in the treatment of certain forms of obesity.

Besides the above, there are numerous other measures which are specially designed to develop the chest, to aid in the breathing movements, and to develop the muscles of the trunk.



APPARATUS FOR AUTOMATIC EXERCISE

OPEN-AIR AND COLD-AIR METHODS

THE open-air method has always been a prominent feature in the Battle Creek Sanitarium System.

Two large outdoor gymnasiums are provided, one for men and one for women. The gymnasium for women is near the ladies' bathroom. The men's outdoor gymnasium is on the opposite side of the grounds, sufficiently removed from the main building to secure the necessary seclusion. The opportunities for open-air treatments afforded by the outdoor gymnasiums are regarded as among the most valuable of the various curative resources afforded by the institution. The sand pile, pure white sand from pulverized flint, such as is used in glass making, the seclusion affording opportunity for the free exposure of the skin to light and air, the running path, the wood pile, the swimming pool, the exercise apparatus and provision for games of various sorts, secure all the advantages of the seashore, and even more.

By this means the circulation of the skin is stimulated. The proof of the effects of the sun's rays upon the skin is to be found in the pigmentation and heightened color which develop rapidly after a few exposures. First exposures are sometimes followed by slight attacks of erythema, which do no harm, but may in fact enhance the beneficial effects.

The skin is capable of holding two-thirds of all the blood in the body. When it is inactive and empty, the necessary result is that the liver and other viscera are congested, and stasis exists in the whole splanchnic area.

The Outdoor Gymnasium

Exposure to cool air also stimulates the activity of the skin. Exercise of the body relieved of trammels of every sort brings each muscle into normal play. After being well warmed by exercise, the patient enjoys a plunge into the clear fresh water of the swimming pool, just cool enough to be refreshing and invigorating.

During the summer months, manual Swedish gymnastics and a great variety of exercises, some of which, though long used in the Battle Creek System and utilized for a hundred years in Sweden, are just now becoming familiar to the public under the names of "Osteopathy," "Movements," etc., and are administered in the free air of the outdoor gymnasium. Patients chop wood, saw wood, play at basket-ball, "volley-ball," and other simple games, walk and trot around the running path, take swimming lessons, and engage in all kinds of exercises without other covering than simple trunks, so that the skin becomes hardened, toughened, and in many cases as brown as that of a North American Indian.

The effects of such tanning and hardening of the skin upon the internal organs are in the highest degree beneficial. Appetite and digestion improve, heart vigor increases, hepatic and renal activity are encouraged, normal metabolism is encouraged, and the patient feels daily the growth of

OUTDOOR CALISTHENICS

FRESH AIR CURE

FRESH AIR SLEEPING ARRANGEMENTS

new life and vigor under the stimulus of the natural forces by which the body is created and maintained.

Thus all the best advantages of the seashore, camping out, "going fishing," and other forms of recreation are secured, while the patient is protected from excess by the careful guidance of his physician, and has the advantages of medical care, dietetic regulation, etc., in addition.

Walking Parties

Outdoor walking parties are greatly in vogue and are a source of great pleasure as well as profit. These parties are accompanied by a physical director or a naturalist who knows all the birds and trees, and expounds to the uninitiated the teachings of the great book of Nature.

The invalid's dread of cold weather is really a dread of chilling or getting cold,—a dangerous thing for sick folks. That, however, is quite another matter. The invalid should breathe cold air, but he should be kept warm. The ideal is cold air for the lungs, warmth for the rest of the body.

The Arctic explorer requires a large ration, not so much to keep his hands and feet warm, for he clothes himself so warmly that even the searching Arctic cold can not reach him, but because he breathes cold air.

Open-Air Sleeping Arrangements

Open-air sleeping arrangements are provided for those who can be induced to use them. There are special sleeping porches for ladies. Here those who enjoy sleeping in the open air are snugly tucked away by the nurses, wrapped as warmly as for a sleigh-ride in the polar regions, and protected, if need be, by hot-water bags, or thermoelectric blankets, which furnish heat in any amount as long as desired,—warmth on tap like water; just touch a button and the bed warms up at once.

Watchful nurses are at hand ready to give any needed assistance.

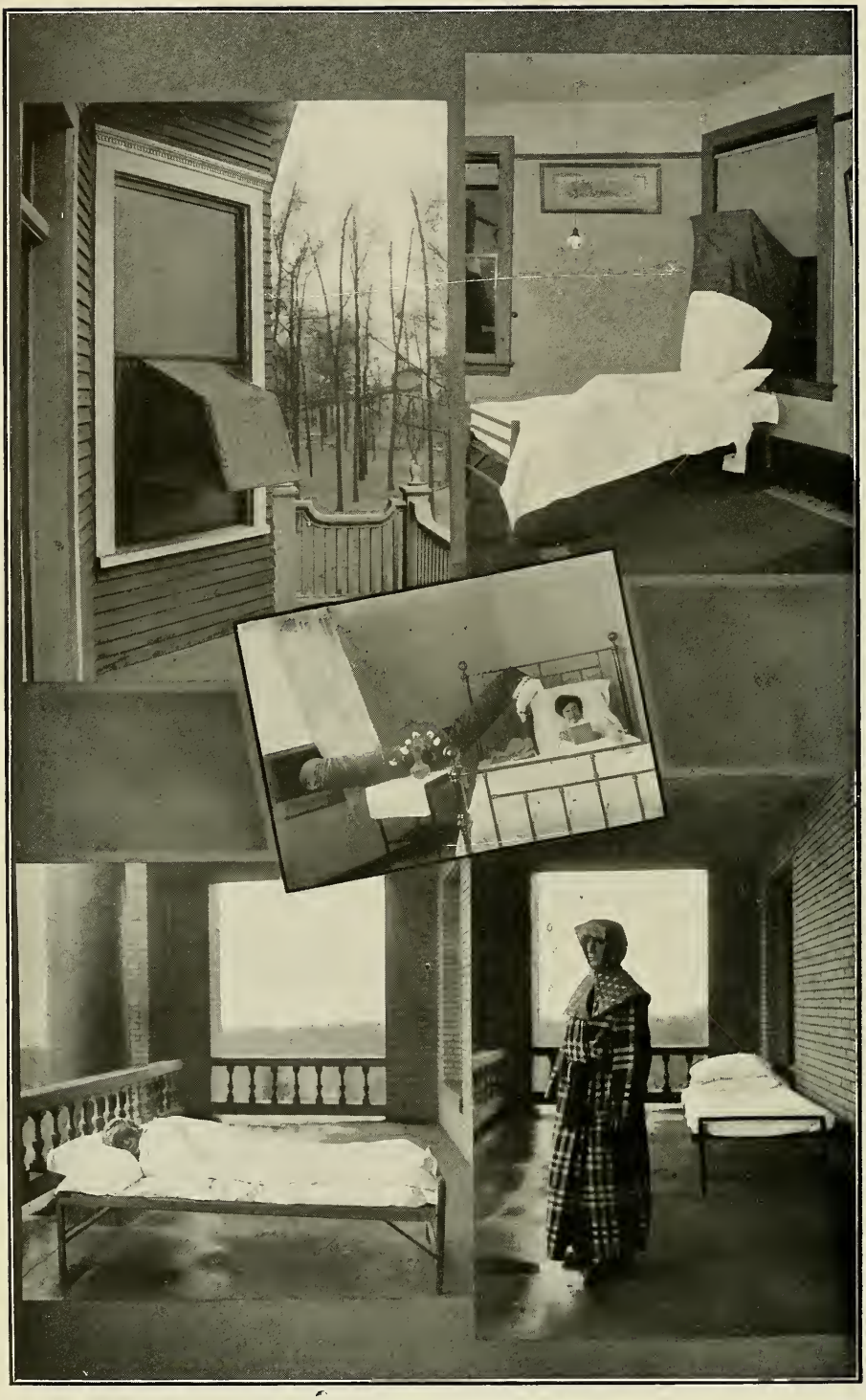
There are sleeping bags and hoods for those who wish them. They keep the body as warm as toast all night long, and allow the pure cold air to be inhaled without fear of chilling or of "catching cold."

The window tent is an ingenious invention by the aid of which the sick person may have all the advantages of the pure cold air without going out of doors. By this plan the head is outdoors while the rest of the body remains warm and comfortable indoors.

The fresh-air tube is a Sanitarium device for conveying fresh air to the patient from an adjoining window. It works well, and is adaptable to any room and to all possible conditions. The patient may breathe the coldest of winter air while snugly tucked away in his cozy sleeping-room. With this device he gets all the advantages of the pure cold air with none of the inconveniences or possible risk of out-of-door sleeping.

Out-of-Door Attractions

Skating, tobogganing, skeeing, and other outdoor sports invite those who are strong enough to enjoy them. There is always ice, and usually plenty of snow, during the mid-winter season in the Peninsular State.



FRESH AIR SLEEPING ARRANGEMENTS

Many of the patients enjoy a wheel-chair outing on the long porches. The nurses bundle them up warmly, and back and forth they go under the long porticos, chatting with one another as they pass, enjoying the outdoor life and taking long breaths of the vitalizing oxygen.

The Faculty of the Sanitarium

The corps of physicians consists of more than twenty thoroughly trained medical men and women, all of whom have been specially trained for Sanitarium work, and have had many years of experience in the institution. All these physicians are graduates from first-class medical schools. Some have received honors and diplomas from the highest medical authorities and organizations.

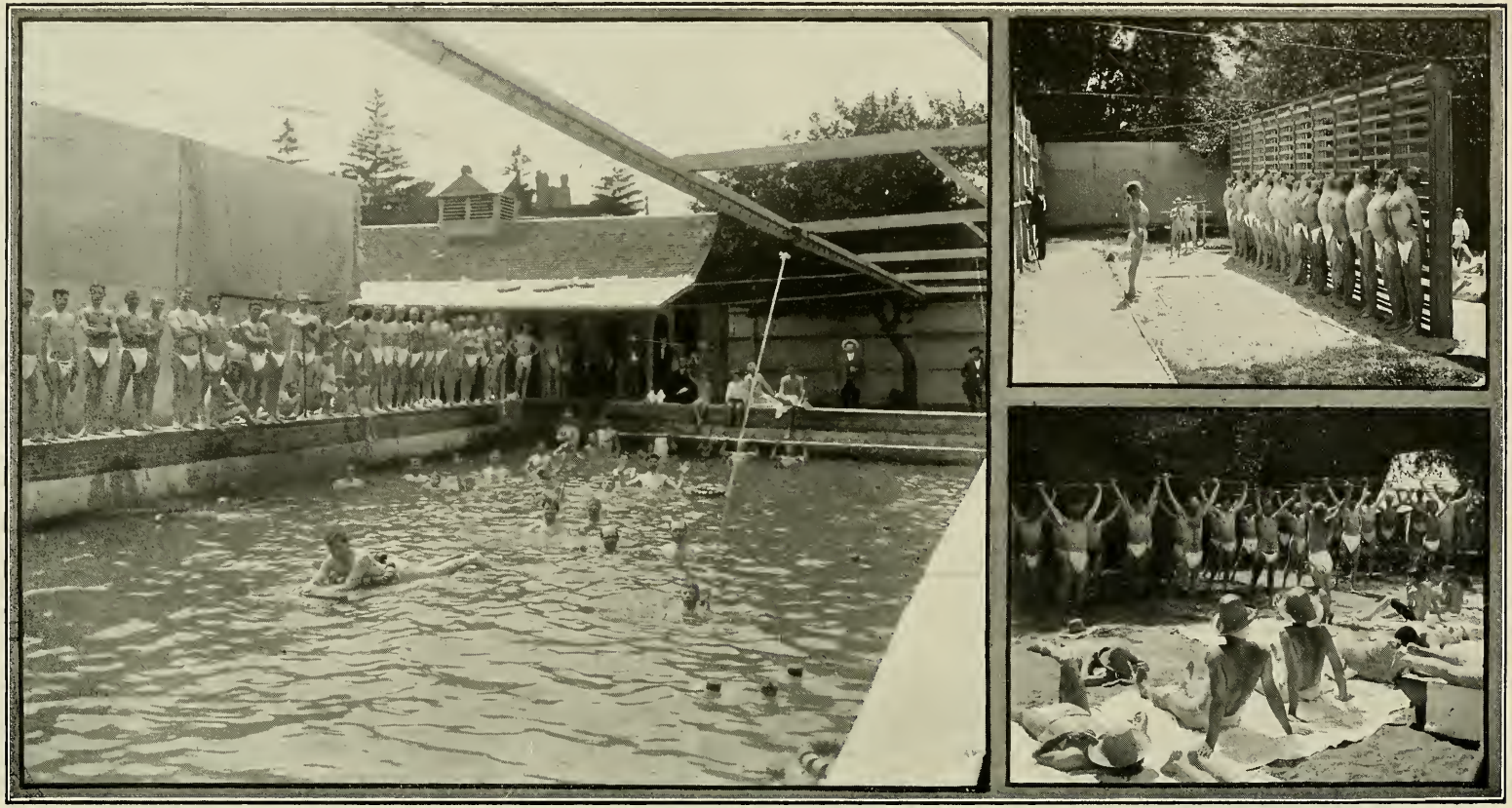
Battle Creek Sanitarium Faculty

J. H. Kellogg, M. D., F. R. S. M., Supt. ..... Surgeon
W. H. Riley, M. S., M. D. ..... Neurologist
C. E. Stewart, M. D. ..... Internal Medicine
E. L. Eggleston, M. D. ..... Internal Medicine
R. H. Harris, M. D., F. R. C. S. E. ..... Assistant Surgeon
W. F. Martin, M. D. ..... Internal Medicine
M. A. Mortensen, M. D. ..... Internal Medicine
B. N. Colver, M. D. ..... Pathologist, Eye, Ear, Nose and Throat
J. T. Case, M. D. ..... Roentgenologist
A. W. Nelson, M. D. ..... Bacteriologist
H. S. Kelsey, M. D. ..... Internal Medicine
A. J. Read, M. D. ..... Electro-Therapeutics
Paul Roth, M. D. ..... Chemist, Internal Medicine
S. E. Barnhart, M. D. ..... Assistant, Internal Medicine
Carrie S. Staines, M. D. ..... Internal Medicine
Gertrude Johnson, M. D. ..... Internal Medicine
Laura B. Stoner, M. D. ..... Internal Medicine
Bertha E. Moshier, M. D. ..... Internal Medicine
Mary V. Dryden, M. D. ..... Internal Medicine
Louie E. Vandervoort, M. D. ..... Obstetrician
Clara V. Radabaugh, M. D. ..... Internal Medicine

Mrs. M. S. Foy, R. N. ..... Supt. Training School for Nurses
Miss Lenna F. Cooper ..... Dietitian, — Principal School of Health and Household Economics
W. W. Hastings, A. M., Ph. D. ..... Dean Normal School of Physical Education
Miss Caroline Zahn, R. N. ..... Medical Receiving Matron

OUTDOOR GYMNASIUM

OUTDOOR SWIMMING POOL



OUTDOOR GYMNASIUM

THE BATTLE CREEK SANITARIUM DIET SYSTEM

AFTER many years of patient study of the various practical questions relating to dietetics, a plan has been perfected whereby foodstuffs and food elements may be prescribed and administered with the same precision with which powerful drugs are given. The difficulties in the way of properly regulating the dietary of patients under ordinary circumstances are practically insurmountable. Questions which the patient always asks his physician are, What shall I eat, and How much shall I eat? It is scarcely possible to ask a physician two more troublesome questions than these if any effort is made to answer the inquiries intelligently.

The calorie system perfected in the dietetic department of the Battle Creek Sanitarium and the organization connected with it, make it possible to answer these questions with the greatest ease, and with scientific precision. This system consists of the following elements:

1. A large variety of appetizing foodstuffs numbering several hundred dishes, the composition and caloric value of each of which is accurately known. The application of the caloric method of estimating food values is necessarily the foundation of scientific dietetics. Food is the only source of energy to the body. It is made up of various elements which differ in their energy content and in their food value. When the composition of a food is known, its caloric value, that is, the number of food units which it contains, may be easily determined. By multiplying its percentage values by proper fractions, the number of calories per ounce of each food principle may be found. The factor for proteins and carbohydrates is 1.16; for fats, 2.63. By the use of these factors, it is easy to make a list of foods of known energy value per ounce, provided one has at hand a table showing the percentage composition of foodstuffs. Extensive tables of this sort are published by the United States Government. Bulletin No. 28 (Revised) of the Agricultural Department is particularly valuable. The data furnished by this bulletin have served as a foundation for the tables which are in use at the Battle Creek Sanitarium. (For tables used, see Appendix.) Aid was also obtained from the exhaustive works of Koeing and Gautier. The large number of new foodstuffs and food combinations or dishes, made necessary many original analyses and calorimetric tests. The results of calculation have been verified by the determinations made with the bomb calorimeter.

It is of primary importance that the composition of a dish, when once determined, shall be maintained at a uniform standard. This requires constant vigilance and supervision, and the service of cooks who have been specially trained for the work, so that food shall be prepared with the same degree of accuracy which the chemist brings to his work. Indeed, the kitchen in such a scheme as this must be organized as a laboratory and

Battle Creek Sanitarium

DINNER

Sunday, April 28, 1912

		Protein	Fats	Carbo.	Oz.	Portion
SOUPS	Tomato Bisque	14	50	11	4¾	¾
	Savory Potato Soup	11	26	38	4¾	¾
ENTREES	Protose Fillets	43	46	36	4	1¼
	Nuttolene—Apple Sauce	29	56	40	3	1¼
	Rice a la Carolina	13	63	74	3	1½
VEGETABLES	Baked Potatoes	11	1	88	3	1
	Brown Sauce	3	64	8	2¼	¾
	Escalloped Potatoes	15	45	90	4½	1½
	Creamed Parsnips	7	16	52	3	¾
	Fresh Asparagus	5	15	5	1	¼
RELISHES	Lettuce—Lemon	2	1	7	1¼	1/10
	Tomato Jelly—Mayonnaise	12	6	32	3½	½
	Cabbage Salad	4	30	16	2	½
	Malt Honey	0	0	200	2¼	2
	Malt Honey with Butter	0	100	100	1½	2
	Malt Sugar	3	16	81	⅞	1
BREADS	Whole Wheat Bread—1 slice	12	2	61	1	¾
	White Bread—1 slice	9	4	62	1	¾
	Entire Graham Bread—1 slice	10	4	61	1	¾
	Breakfast Toast—2 pieces	4	12	34	½	½
	Toasted Granose Biscuit—two	7	1	42	½	½
	Toasted Rice Biscuit—two	4	0	46	½	½
	Bran Biscuit—two	21	31	73	1	1¼
	Nut Butter	28	105	17	1	1½
	Dairy Butter—1 square	1	99	0	½	1
COOKED FRUITS	Cherry Sauce	4	6	90	3	1
	Stewed Figs	6	1	143	3	1½
BEVERAGES	Apple Juice	0	0	50	3½	½
	Grape Juice	0	0	50	3½	½
	Caramel Cereal—1 teacupful	1	1	8	4	1/10
	Cream—1 pitcherful	6	107	12	2¼	1¼
	Sugar—1 sugarspoonful	0	0	25	1/3	¼
	Kaffir Tea	1	1	8	4	1/10
	Sanitas Cocoa	13	89	23	5	2¼
	Hot Malted Nuts	36	96	68	1¼	2
	Milk	23	67	35	6	1¼
	Yogurt Buttermilk	28	5	42	6	¾
DESSERTS	Date Cream Pie	42	87	171	4	3
	Oranges	4	2	69	5	¾
	English Walnuts	9	82	9	½	1

d

To ascertain the number of calories eaten of each element, add the figures in first, second and third columns, opposite the various articles eaten and put down the sums at the foot of the respective columns. Mark each article eaten, sign bill of fare, and hand to your physician.

A "portion" is that quantity of any food which contains 100 calories or food units. No food to be taken from the Dining-room.

NAME..... **ROOM**.....

conducted under laboratory rules and in harmony with laboratory principles.

2. It is necessary that the food, after having been properly prepared, shall be served in portions of known values and weighed with almost the same care with which the pharmacist dispenses drugs. In no other way can the patient be assured that his dietary conforms to the requirements of his prescription. This calorie system, which was perfected in this institution, has now been in use since 1905. It is found indispensable in the dietetic management of the sick.

The accompanying reproduction of a bill of fare as actually used at the Sanitarium will show how the plan above briefly outlined is carried out. The diet tables and special diet lists employed in operating this system of dieteties will be found in the Appendix.

By this system it is quite possible to regulate the dietary of every patient, to give him just the amount of proteins his case requires, and with equal accuracy to regulate his ration of fat and carbohydrates. The system is indispensable in the treatment of cases of obesity, diabetes, and great emaciation.

The Bill of Fare

The bill of fare must be prepared in such a way as to show for each dish just the number of calories of each food element furnished in each portion served, so that the patient or nurse may be able to select such dishes and such number of portions as will furnish the patient the total number of calories required by his prescription, and the number of calories of proteins, carbohydrates, and fats designed by the physician. The bill of fare, properly checked by the patient or his nurse, becomes a record of the meal, and hence, when delivered to the physician, shows in just what way and to what extent the patient is following his prescription. It is believed this is the first effort ever made to place the menus or bill of fare of a large institution upon an exact and scientific basis for the purpose of controlling nutritive processes in harmony with the known principles of human metabolism. The practical difficulties to be overcome were very great, but the results amply repay the expense and effort required, and it is hoped that the methods worked out may prove of service to other establishments in accomplishing similar purposes. For sample bill of fare see page 110.

The Individual Standard Ration

It is necessary to have a standard ration with which to compare the dietary of each patient. The dietetic requirements of healthy persons vary greatly, and not only with the sex, but also with the size, and with the occupation; hence a single standard ration is not sufficient. It has been necessary to work out in complete detail the requirements of individuals of different heights. By the aid of the facts developd by the researches of Gautier, Rubner, and Benedict, and especially the comparatively recent studies or Chittenden and Mendel, it has been possible to construct tables

SERVING ROOM

CULINARY DEPARTMENT

which in practical use with several thousand cases have been proved to be sufficiently accurate to be of the highest service. (See Appendix.)

For example, the patient who eats less than the amount given in the table for a person of his height is insufficiently nourished and must necessarily lose flesh. Since from four-fifths to nine-tenths of all the food taken into the body is used for fuel, a person who is taking an insufficient supply of food is necessarily burning up his own body. It is not an uncommon thing to find emaciated people taking less than half the necessary food requirement, and consequently continually losing in flesh and strength. They are quite unconscious of the fact that they are diminishing in weight simply because they are feeding upon their own tissues.

On the other hand, the person who is taking more than his normal food requirement will probably be gaining in flesh, though this is not invariably the case. The surplus is sometimes worked off through the kidneys, bowels, and other emunctories at the expense of great loss of energy to the system.

By accurately regulating the food supply according to the actual requirements of the individual, any deficiency may be made good so long as the nutritive powers are not completely exhausted.

Dosing the Diet

The proper dosing of the food to meet the needs of individual cases is fully as important as the adaptation of drug prescriptions to individual cases.

The height being known, a reference to the table at once shows the proper number of calories of each sort of food element for a normal, balanced ration. If the person is emaciated, from ten to twenty per cent may be added; if he is obese, the amount is diminished one-third to one-half for a time.

By the aid of this system, as will be readily seen, the physician has such complete and easy control of a patient's dietary that never for a moment need he be in the dark as to the exact situation, while he can answer easily and promptly questions which without the aid of the system outlined are almost, if not altogether, unanswerable.

The old dietetics was guesswork and experimentation. Sometimes patients were somehow relieved, nobody knew just how; more often there was no relief, and even an aggravation of troubles. There were no clearly defined principles, no precise and definite method.

The new dietetics is based on solid facts which have been demonstrated by laboratory researches, especially those of Pawlow and Chittenden, and which are accepted as the latest dictum of science.

Care is taken that the dietary shall not be monotonous. The importance of relish and palatability is fully recognized. Pawlow has shown the importance of "appetite juice" as a dominant factor in digestion, so every care is taken to provide patients with tasty, well-flavored dishes which shall furnish nutritive material in the most easily digestible form and in just the proportion suited to each individual case.

Pawlow's work, with that of Metchnikoff, Tissier, and Combe, has rendered possible the classification of food products in a new way, and enables

WINTER SOLARIUM AND SUMMER DINING ROOM

MAIN DINING ROOM

us to make use of food in the treatment of various digestive and nutritive disorders with a far greater degree of accuracy and efficiency than was possible a few years ago.

Scores of new foods have been discovered and developed, which are each possessed of special and definite therapeutic properties, specially selected to meet certain needs and conditions.

The hundreds of special dishes and scores of special food preparations, each of which has been carefully studied in relation to its nutritive and therapeutic properties, are classified in diet lists which are used by the physicians in arranging the diet prescriptions of individual patients. Additions to these lists are continually being made as the result of the work of the experimental kitchen, which is constantly bringing out tasty and appetizing combinations.

All these dietetic advantages are at the command of the patient. The culinary department of the institution is, in fact, simply a large food laboratory in which a score of specially trained cooks and dietitians cater to the dietetic needs and fancies of a thousand sick folk daily during the busiest months.

Several dietitians are always in the dining room during meals, ready to render assistance to those needing aid. In special cases, the bill of fare for each meal is indicated by a dietitian under direction of the physician.

The Diet Kitchen

A special and well-equipped diet kitchen, from which several hundred meals are sent out daily, is in commission every hour of the day and night.

Visiting physicians are always interested in the "serving-room," where the foods are weighed in portions, to be transported, steaming hot and savory, by the busy waiters to the dining-room. The deftness with which this "apportioning" is done by the use of balances conveniently placed renders this an interesting sight.

BANQUET IN THE GYMNASIUM

DINING ROOM WAITERS

FOOD SUPPLIES

AS THE scientific regulation of the dietary is one of the chief features of the Sanitarium system, the matter of food supplies receives very particular attention.

One of the essentials of a dietary especially designed to meet the needs of invalids is pure milk. Ordinary commercial milk is one of the most unclean foods that ever appears upon the table. Not infrequently such milk contains as many as ten to twenty millions of bacteria to the teaspoonful. The ordinary method of producing milk affords abundant opportunities for contamination with stable filth, dust, fragments of manure, etc., to say nothing about the tubercular and other bacteria which may be derived directly from the cow.

Pure Milk

The milk and cream used by the Sanitarium family of patients and helpers is the product of a number of carefully inspected dairies aggregating five hundred cows. This entire milk supply is examined weekly in the bacteriological and chemical laboratories of the institution so as to insure the highest degree of excellence.

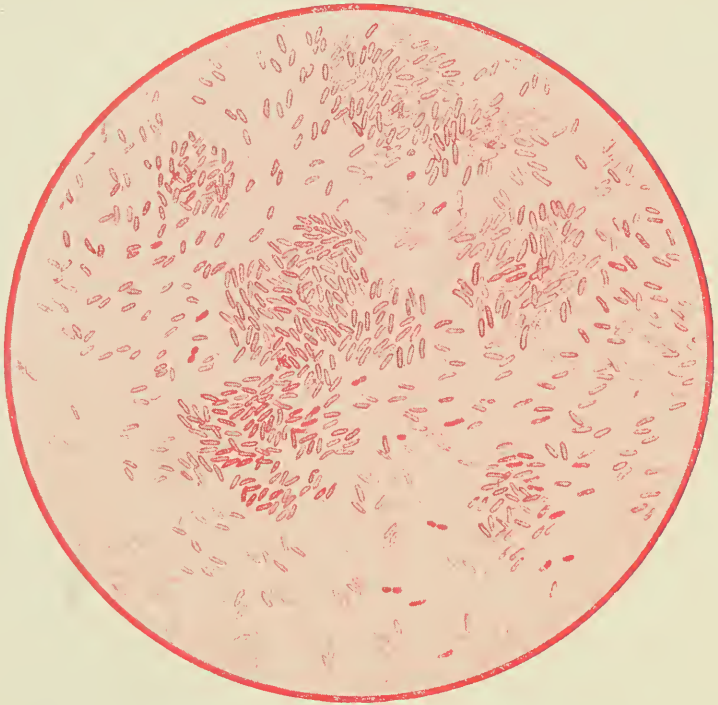
The milk and cream served upon the table of the institution are furnished by a dairy which is conducted in accordance with the strictest rules for the production of certified milk. The cleaning of the cattle as well as the milking is done by the vacuum method, so there is no exposure of the milk to the air of the stable and no chance for contamination by human hands. In addition to these precautions, the cattle are examined by competent veterinary authorities, are tested for tuberculosis, and are fed and cared for in the most scrupulous manner.

The Creamery

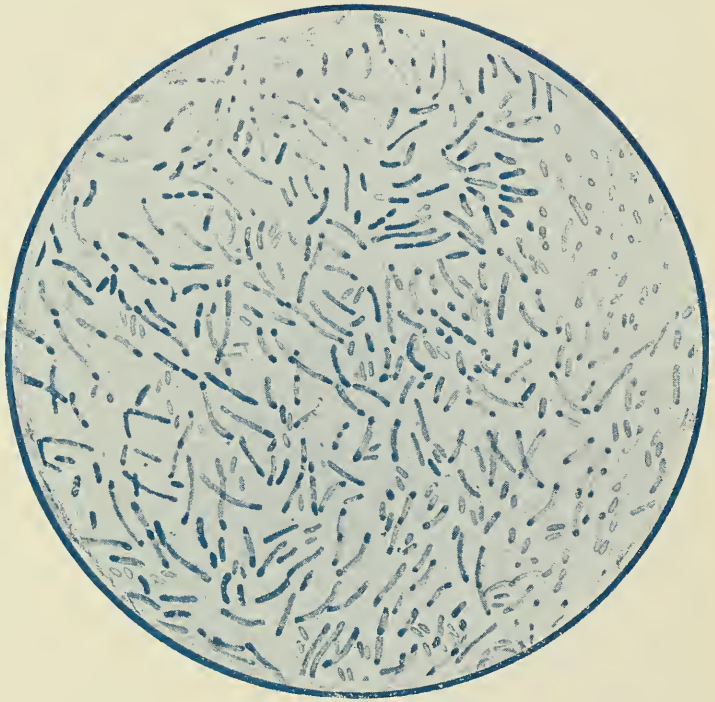
The creamery in which this work is done is on the premises and is presided over by a carefully trained man who knows the dangers from microbes, and how to avoid them, and is under the supervision of the expert bacteriologist of the institution. In dealing with many forms of chronic disease these sterilized dairy products, especially germless butter and cream, are highly important. Yogurt buttermilk and Yogurt cheese are supplied fresh daily by the creamery, together with cottage cheese, Yogurt whey and other milk products.

Some twenty years ago (1892) an attempt was made to improve upon ordinary kumiss by utilizing special lactic-acid-forming ferments. A study of the observations made at the Pasteur Institute and by Professor Conn, of the Connecticut Agricultural Experiment Station, located at Middletown, Conn., upon milk bacteria, led to the selection of certain ferments which produce pure lactic acid, thus eliminating alcohol, the products of bacterial action upon fats, and other unwholesome products which are

COTTAGES



UNFRIENDLY GERMS



FRIENDLY GERMS

found in kumiss, kephir, and ordinary sour milk. Using these ferments with sterilized milk, a product was obtained of superior flavor, the use of which could be prolonged indefinitely without risk of any possible injury through absorption of alcohol and other toxic bodies found in the ordinary sour milk preparations. Roger has recently called attention to the injuries which may result from the long-continued use of kumiss on account of the alcohol which it contains, and which often reaches a proportion equal to that in which it occurs in lager beer and other intoxicating drinks. Recent discoveries have added greatly to our knowledge of fermented milk products, and increased our appreciation of their therapeutic value.

The Protective Ferments, Bacillus Bulgaricus, Bacillus Bifidus, and Glycobacter

One of the most valuable products of the Sanitarium creamery is Yogurt, the Bulgarian fermented milk which has been studied in recent years by Doctor Tissier, of the Pasteur Institute, and Massol, of Geneva, and later by Metchnikoff. This milk preparation, known in Bulgaria as *yogurt*, in Turkey as *madzoon*, in Egypt as *leben*, and in India as *dahdi*, has been known to Oriental people and extensively used by them from the most ancient times. It is believed by Metchnikoff to be a prime factor in the marvelous longevity of the Bulgarians, who are longer lived than any other known race.

The bacteriological study of this product revealed a new lactic-acid-forming bacillus which has marvelous powers of acid production and the most remarkable resistance. Tissier, of the Pasteur Institute, Paris, and Distaso, have shown that the protective flora or friendly germs which take possession of the small intestine at birth are displaced by harmful bacteria which result from the use of flesh foods and other germ-infected foodstuffs, so that most adults among civilized people have their intestines filled with bacteria which are identical with those found in the intestines of carnivorous animals and are carrying on constantly an active process of putrefaction. This condition has been shown by Combe and numerous others to be responsible for a large part of the chronic disease from which civilized human beings suffer. One of the things most necessary to accomplish in the treatment of cases of chronic disease is to change the bacterial flora of the intestine by the restoration of the normal protective bacteria. This can only be accomplished by a most careful regulation of the diet and the use of cultures of the protective organisms. Three important protective organisms or so-called beneficent bacteria are now well known. First of these may be mentioned the *Bacillus Bulgaricus*, discovered by Massol, scientifically studied by Tissier, and popularized and exploited by Metchnikoff. This bacillus forms lactic acid in larger quantity than any other known. It is not active to the human intestine, but under favorable conditions can be made to grow in the colon. Soon after the discovery of the *Bacillus Bulgaricus*, Doctor Tissier, of the Pasteur Institute, in studying the stools of healthy infants, discovered the *Bacillus bifidus*, a protective organism which takes possession of the intestine of the infant within a few

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hours after birth. This bacillus grows in the large intestine and produces acetic acid. It belongs to the normal flora of the alimentary canal, but by an unwholesome diet is largely displaced by the colon bacillus and putrefactive bacteria. Tissier reports the cure of thousands of persons suffering from intestinal disorders by administering daily cultures of this bacillus. Through the courtesy of Doctor Tissier, consulting bacteriologist of the Battle Creek Sanitarium, we have received supplies of these cultures from the Pasteur Institute.

Metchnikoff, of the Pasteur Institute, has recently announced the discovery by himself of a new protective organism—glycobacter. Distaso claims to have discovered the same bacillus some months earlier. This organism promises to prove of great value in increasing the activity of the *Bacillus Bulgaricus* and the *Bacillus bifidus*. The last named germs both require sugar to support their growth in the intestine. Unfortunately, there is generally little or no sugar in the colon, as the sugar is fully absorbed in the small intestine. The *Bacillus glycobacter* forms sugar from starch in the colon, and thus is able to supply to the *Bacillus Bulgaricus* and the *Bacillus bifidus* the material needed for their development.

In the treatment of cases of chronic constipation, autointoxication, especially in cases of Bright's disease, arteriosclerosis, exophthalmic goiter, cirrhosis of the liver, colitis, gastroenteritis, pernicious anemia, sprue, and achylia, these cultures are used with very great advantage. In all the conditions mentioned, and in most chronic disorders, bacteriological examination of the feces shows exceedingly bad flora. By the use of liquid cultures of the protective organisms above mentioned, combined with an antitoxic or atoxic dietary and increased intestinal activity, the flora is rapidly changed. Welch's Bacillus, the *Bacillus subtilis*, *Proteus Bulgaris*, *Bacillus coli*, and the various classes of gram positive cocci—all proteolytic or putrefactive poison-forming organisms—rapidly diminish in numbers and in large part disappear, being replaced by acid-forming protective bacteria, the normal flora of the intestine. With this change of the intestinal flora, the symptoms presented by the above-mentioned disorders rapidly disappear.

Putridity of the stool often disappears in a few days, and with the putridity disappear the accompanying and dependent symptoms—foul breath, foul tongue, sallow skin, mental depression, insomnia, "biliousness," anorexia, headaches, and a host of aches, ailments and distresses which modern physiologic research has traced to a common origin in intestinal autointoxication.

To those who are not able to use milk the ferment is given in capsules or tablets as well as in liquid cultures, and in the form of yogurt whey, a by-product of the manufacture of yogurt cheese. Yogurt whey is one of the most agreeable and certainly is one of the most effective methods of introducing this remarkable therapeutic ferment into the alimentary canal. Yogurt whey is also given by enema.

Food Specialties

The choicest fruits of all sorts, fresh, and canned in glass in the institution cannery, are a specialty much appreciated by the guests. Tens of thousands of gallons of fruit juices and fruits of various desirable

COTTAGES

kinds are put up in bottles and jugs in the summer and fall. These choice products are much relied upon as a means of establishing intestinal asepsis and thus combating the autointoxication which is so often encountered in the chronic cases coming to the Sanitarium for treatment. In addition to these preserved preparations, fresh fruit is supplied in abundance, and fresh fruit juices as well as other raw fruit and vegetable juices are prepared daily and served by special prescription to those requiring these special preparations.

The freshest and finest of green vegetables in season, and bread and cereals in unprecedented variety fill out a bill of fare ample and varied enough to tempt the palate of the most whimsical of invalids.

For nearly thirty years there has been conducted at the Battle Creek Sanitarium an experimental kitchen, in which many thousands of experiments have been made, the results of which have been the production of a new system of cookery and a novel dietary with hundreds of new dishes, each of which has been carefully prepared with reference to both palatability and digestibility, and which has been studied calorimetrically, so that its food value is known.

The Original Sanitarium Health Foods

All the so-called Sanitarium health foods are regularly found on the Sanitarium bill of fare, having been originally devised solely for this use. The character of these foods can not be judged by the numerous imitations and piracies which are lauded by newspaper and signboard advertisements in terms not unlike those employed by the patent medicine vendor.

The Battle Creek Sanitarium has no connection whatever with these questionable exploitations. The first thoroughly cooked and dextrinized cereal food preparation was a Battle Creek Sanitarium product. During more than thirty years experimental work has been steadily carried forward with the purpose of improving the palatability and digestibility of man's natural foodstuffs. The first dextrinized cereal was a granular product. The next important advance was a toasted flaked cereal, in which each grain was spread out into a thin film and toasted slightly brown. The perfection of the methods and machinery for the production of these cereal preparations on a large scale, occupied several years. All the numerous toasted flaked cereals now offered in the market under various titles are made by the same methods, used with varying degrees of success. The original purpose in making the toasted cereal flake was to displace the half-cooked, pasty, dyspepsia-producing breakfast mush, by a thoroughly cooked and easily digestible cereal which might be eaten either dry or moist, and which would enter easily into solution.

That the eating habits of the American public have been materially modified is evinced by the fact that thirty to forty carloads of toasted flaked cereals are being eaten daily under various names in the United States alone, and the consumption is steadily increasing. Toasted cereal flakes and the methods of making them are a Battle Creek Sanitarium idea which has won favor throughout the world.

COTTAGES

The Farms and Hot-Houses

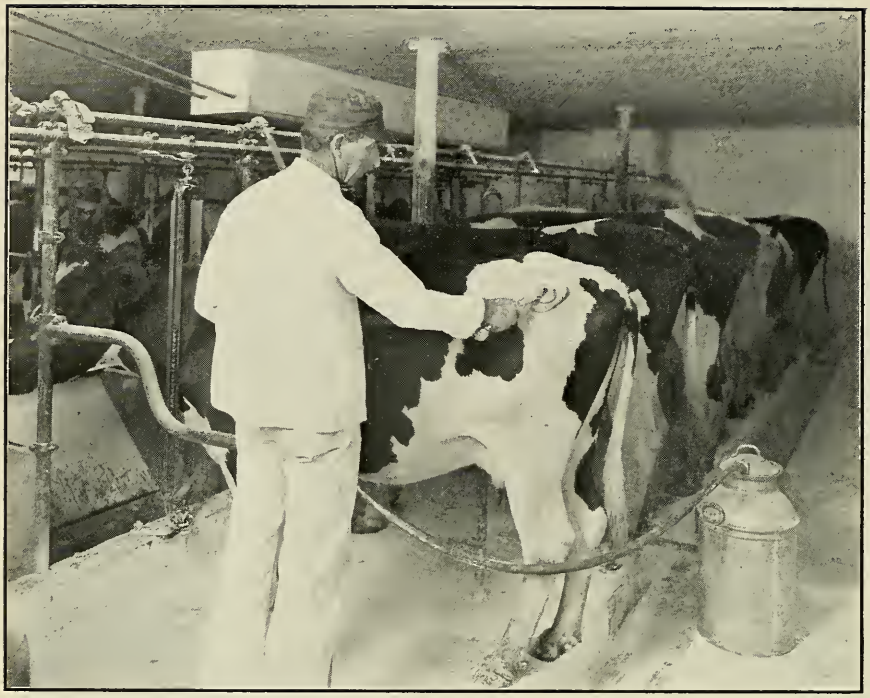
Two large farms and several hot-houses supply a large part of the fresh garden vegetables, besides quantities of peas, tomatoes, fruits, and flowers. The extensive greenhouses maintained by the institution, comprising more than twelve thousand square feet of glass-covered beds, supply the table with an abundance of fresh green vegetables, such as lettuce, fresh tomatoes, and various relishes, besides a profusion of flowers in pots and vases. The use of lettuce, celery, and some other fresh vegetables as supplied in market is always attended, as Metchnikoff has clearly shown, with more or less risk of parasitic infection because of the careless use of night soil and other fertilizers by market gardeners. Such products, when not obtained from the Sanitarium gardens or greenhouses, are always sterilized in the kitchen by immersion in boiling hot water before serving. It is a help to the invalid's appetite to know that the table delicacies placed before him are thoroughly clean.

The Steward's Record

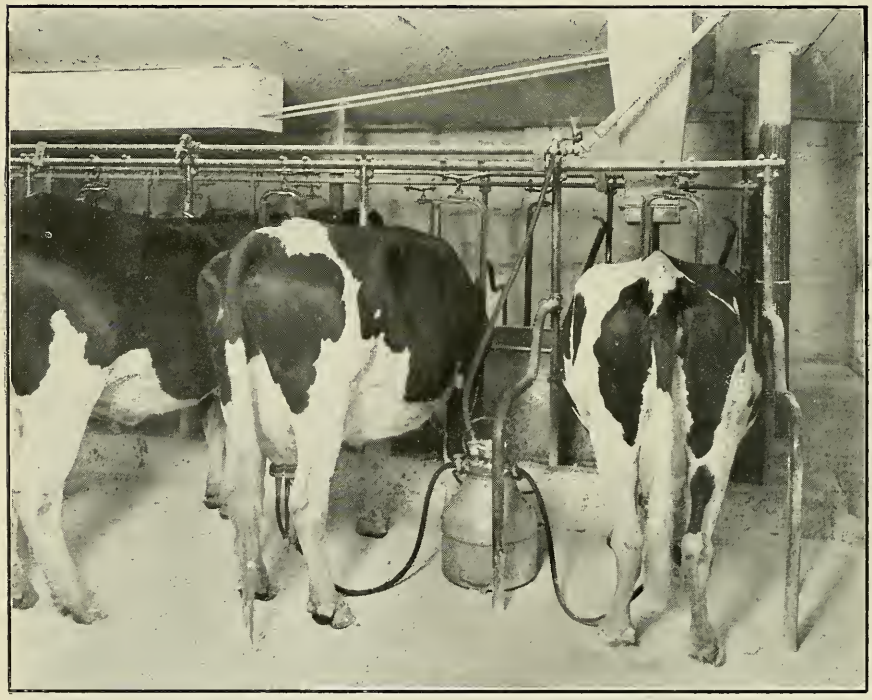
The following items from the annual report of the steward will give something of an idea of the character and quantities of the food supplies annually provided to feed this great family of invalids and those who care for them:

Partial List of the Foods Used During 1911 at the Battle Creek Sanitarium

Apples	2,936 bu.	Canned Strawberries	3,744 qts.
Bananas	1,400 bunches	Potatoes	6,500 bu.
Dates	5,950 lbs.	Eggs	42,794 doz.
Figs	13,744 lbs.	Nut foods	1,421 cases
Lemons	550 cases	Miscel. crackers	5,625 lbs.
Oranges	1,650 cases	Granola and Granuto	2,786 lbs.
Peaches	1,338 cases	Zwieback	17,000 lbs.
Pears	360 bu.	Cereal coffee	3,579 lbs.
Plums	260 cases	Glu. meal and flour	1,626 lbs.
Prunes	8,485 lbs.	Beans	13,640 lbs.
Tomatoes	615 bu.	Peas	12,525 lbs.
Grapes	5,500 baskets	Pineapples	11,366
Grape juice	20,000 qts.	Milk	120,704 qts.
Apple juice	16,528 qts.	Cream	37,520 qts.
Canned Pears	9,768 qts.	Fresh berries	32,324 qts.
Canned peaches	7,440 qts.	Rice	8,730 lbs.
Canned plums	1,560 qts.	Butter	56,029 lbs.



CLEANING COWS BY VACUUM PROCESS



VACUUM MILKING MACHINE—SANITARIUM DAIRY

WHO CAN BE HELPED BY THE BATTLE CREEK SANITARIUM SYSTEM

PHYSICIANS and others are constantly asking such questions as these: Can you cure obesity? What can you do for chronic cardiac cases? What can be accomplished by your methods for persons suffering with Bright's disease? What can be done for chronic ovarian disease, intestinal catarrh, chlorosis, pernicious anemia, chronic autointoxication, hysteria, hyperhydrochloria, diabetes, chronic rheumatism, arthritis deformans, and other chronic disorders?

In general it may be said that sufferers from functional diseases rarely fail to recover when willing to devote a reasonable amount of time to the effort.

In cases of structural change, a cure in the absolute sense is, of course, not possible; nevertheless, so great improvement may be secured in many cases that the patient, though he may have been for some time a confirmed invalid and considered incurable, is able to resume the active duties of his business or profession, to enjoy a comfortable degree of health, and to lead a reasonably active life.

Of the many hundreds of persons who each year enjoy the advantages of the Battle Creek Sanitarium System, nearly all are greatly benefited, and by far the great majority are more or less permanently relieved of chronic disabling ailments which are with rare exceptions incurable under conditions surrounding them at their homes.

Few patients visit the Battle Creek Sanitarium who have not previously made use of all the remedies in ordinary use without permanent relief. The usual story told is that many remedies of various sorts have been employed under the directions of various physicians, and that some degree of relief has usually been experienced as each new remedy has been tried, but that the relief was only temporary, and that a condition has finally been reached in which no remedy available affords appreciable relief, and the attending physician has expressed the opinion that more thoroughgoing and radical measures must be employed.

A case illustrating this point was that of a chronic neurasthenic sent by a professor of materia medica in the medical department of a university. In his letter of introduction the Doctor said, "I have had this patient under treatment for the last nine years; I have given him nearly every tonic in the materia medica. He has steadily gotten worse. I am sending him to you to give him the benefit of physiologic stimulation." Under the influence of tonic baths, massage, and a properly regulated dietary, this patient recovered rapidly and was able to return to his business.

Most chronic ailments being due to wrong habits or unwholesome conditions of life, no cure can be permanent which does not correct these

A GROUP OF WINTER SCENES

habits and conditions. Palliative drugs afford temporary relief, but they can not cure.

A permanent cure requires a change in the patient, a regeneration of tissue, constitutional reconstruction, such as can be secured in no way other than by the application of the physiologic method. A change of climate or of occupation is sometimes temporarily sufficient, but more often the patient requires the advantage of measures which powerfully influence metabolism, which encourage hematogenesis and leucocytosis, which increase the alkalinity of the blood and assist blood movement.

Blood-Building

"It is the blood that heals;" hence those measures are the most effective in securing definite and permanent results which are capable of favorably modifying the quality of the blood and its distribution.

Hydrotherapy affords a means by which the blood-count, leucocytosis, and blood movement, both general and local, may be influenced in a most positive and certain manner. By it the local blood volume in any bodily part, internal or external, may be increased or lessened to the extent of five to six hundred per cent. No drug can accomplish this.

The blood-count may be increased twenty-five per cent or more by a general warm application followed by a short cold spray and friction.

The white cell count of the blood may be increased one hundred percent or more within the same length of time by similar measures.

The blood-pressure may be raised or lowered within two to fifteen minutes by suitable hydriatic applications, massage or other physiologic means, and to the extent of twenty to sixty millimeters of mercury.

One of the most remarkable characteristics of the physiologic method is that the applications may be repeated as frequently and as many times as may be needful or desirable, and with increasing rather than lessening effect, for the body never becomes habituated to physiologic applications as it does to the use of drugs. Indeed, the intensity of the vital response increases as the patient improves in general vigor.

The measures by which improvement in the quantity and quality of the blood is secured are chiefly the following:

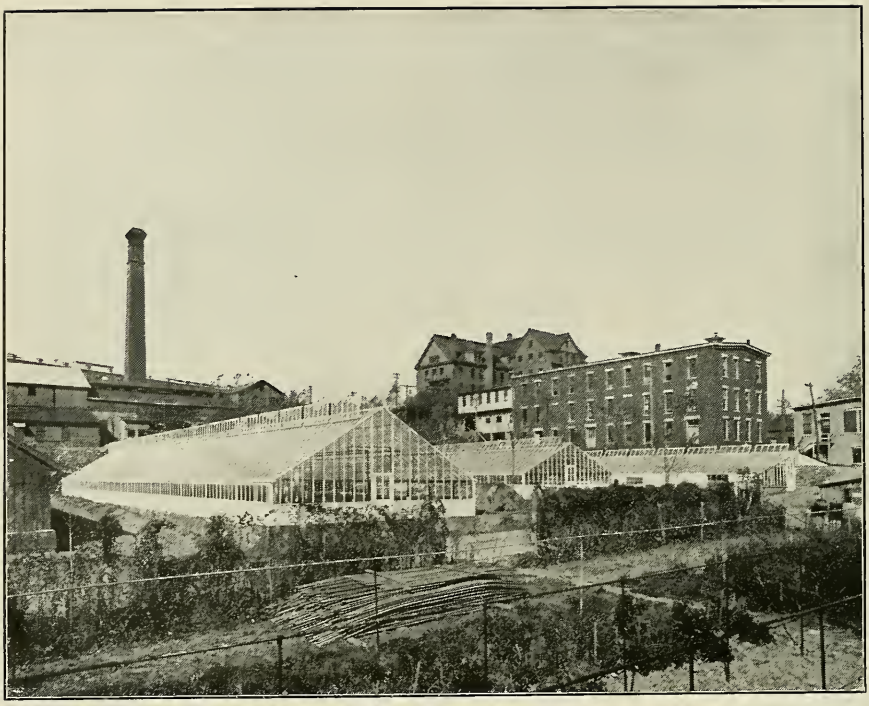
1. By feeding of foodstuffs which are rich in iron and hemagene and those salts which increase blood alkalinity. The great value which attaches to the subtle substances found in the juices of raw fruits and certain vegetables is not overlooked.

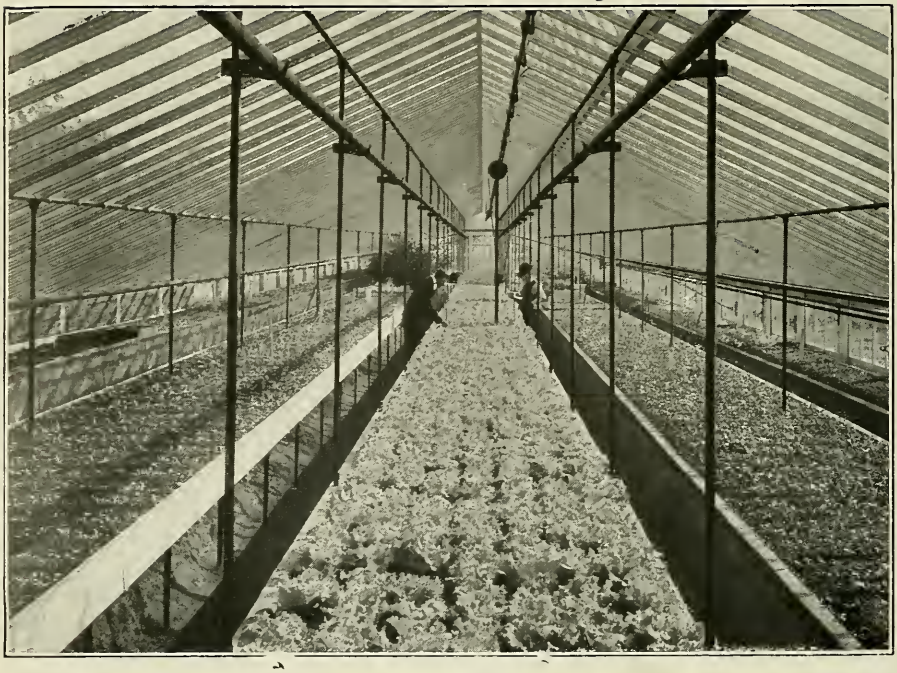
2. Special attention is given to the improvement of the digestion by adaption of the food to the individual's condition, and the application of such measures as are known to aid gastric secretion and motility.

3. The daily ration is carefully balanced to the patient's needs, so that no energy shall be wasted in the elimination of useless material.

4. All possible sources of autointoxication are suppressed, especially intestinal putrefactions. This is accomplished, not by drugs, but by an antitoxic dietary, and by various bowel-cleansing processes.

5. Hydriatic measures known to be capable of powerfully stimulating hematogenesis are systematically employed.





GREENHOUSES

6. Application is made of such measures as will increase the opsonins of the blood, an important index of blood quality as well as one of the chief means of defense.

7. The increase in the alkalinity of the blood is accomplished by special regulation of the dietary with this end in view, in accordance with the observations of Bunge, Hindhede, and others.

Increasing Vital Resistance

Laboratory research and clinical experience have shown that vital resistance may be increased—

1. By the application of tonic hydriatic measures.

2. By means of exercise, massage, and whatever promotes blood movement.

3. By the improvement of metabolism which follows suitable applications of electricity as well as hydriatic applications and exercise.

4. By the improved oxidation and elimination of toxins resulting from the breathing of cold air and the outdoor life.

5. By a low-protein dietary, whereby is secured a very great reduction in the amount of toxic protein wastes and putrefactive products, thus clearing out the tissues and improving the quality of the lymph which bathes the tissues.

By the employment of special food preparations containing antitoxic ferments, such as Yogurt. Yogurt is also administered in concentrated form in capsules.

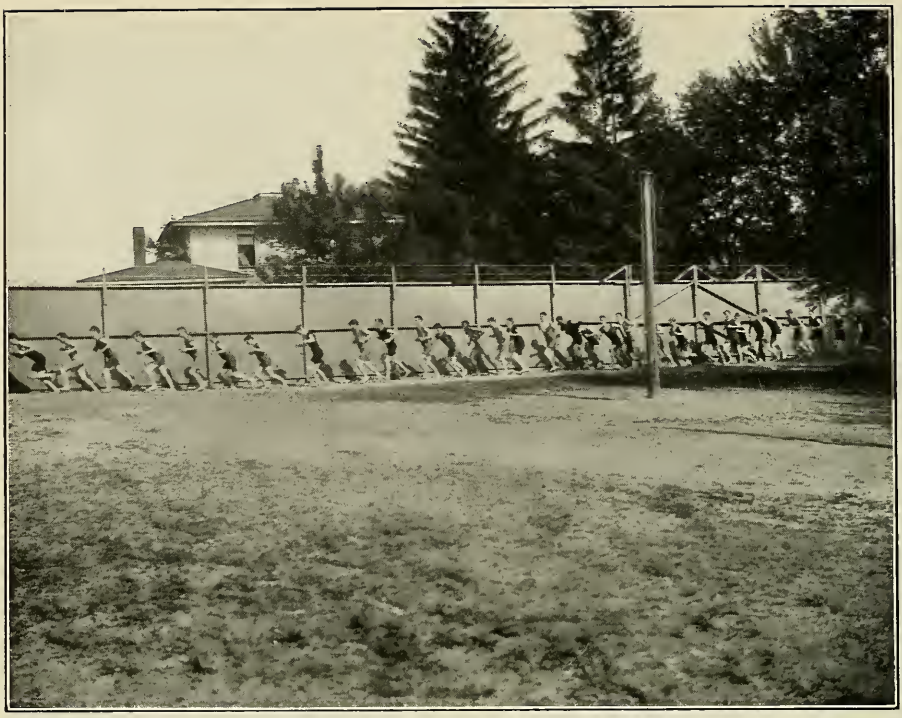
Limited Use of Drugs

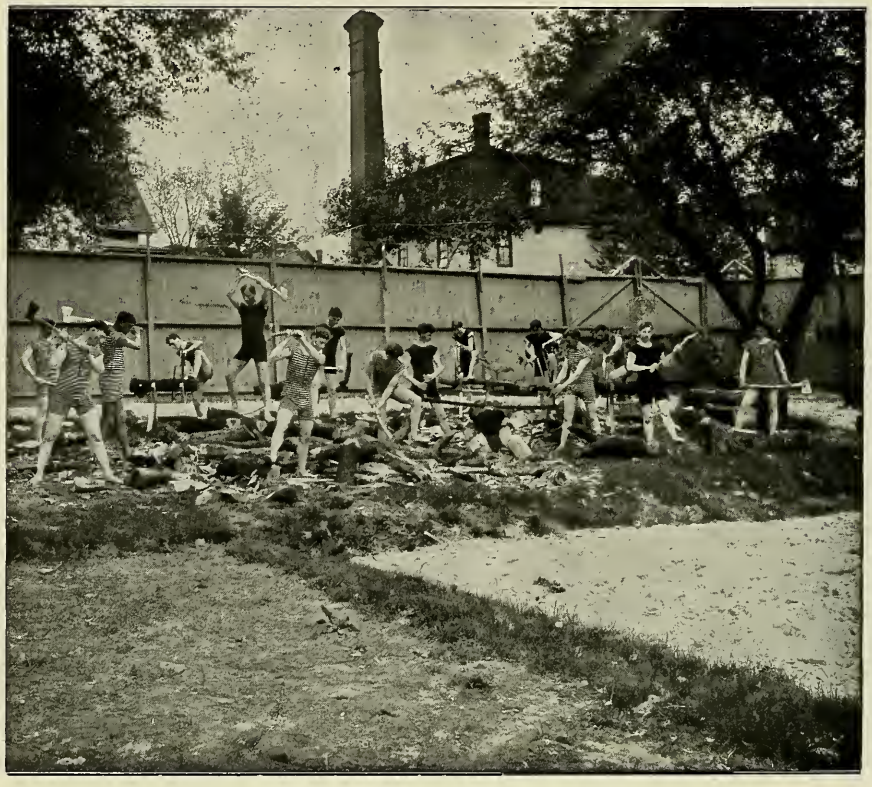
Although no exclusive system is acknowledged or followed, drugs are little used, for the reason that in almost every instance their resources have been quite exhausted before the patient arrives at the Sanitarium; and for the further and still more important reason that little permanent good can be accomplished in the majority of chronic cases by any remedy which stops short of thoroughgoing body reconstruction, which can be accomplished only by physiologic means.

Few drugs can be relied upon to accomplish more than palliation. With this idea, such drugs are employed as may render service, but very sparingly, indeed; for it is never forgotten that drugs do harm as well as good, and the limited period of time which the patient can spend at the institution makes it of the highest importance that no time shall be wasted, and that a foundation for permanent health shall be developed as rapidly as possible by such means as effect improved tissue changes.

Intestinal Autointoxication

First Bouchard, then Roger, Charrin, Metchnikoff, Tissier, and Combe, and later a multitude of eminent European physicians, recognizing the presence in the intestines of putrefactive and other toxin-forming bacteria, attributed to the baneful influences of these toxins a large share of the chronic ailments which appear in the nosological tables as distinct





ONE OF THE TWO OUTDOOR GYMNASIUMS

pathological entities, but which are in reality only the varied consequences of one common condition—intestinal autointoxication. Of the one hundred and sixty different species of bacteria which Roger lists as constituting the flora of the alimentary canal, each one forms its own peculiar product. Many of these products are highly toxic and capable of producing most varied and often destructive effects.

The intestinal bacteria are divided into two classes,—aerobes and anaerobes. Aerobes in general produce harmless acids. The anaerobes are pathologic and putrefactive organisms derived in large part, as Herter shows, from meat, hence designated by him as "meat bacteria." Intestinal autointoxication is conclusively shown to be due to these "wild" bacteria, the anaerobes, which have no useful function in the body, and are responsible, directly and indirectly, for a multitude of maladies.

The wide-spread character of the mischief attributed to these parasitic organisms by modern pathology may be judged by glancing over the following brief summary of the symptoms, morbid conditions, and maladies which are the outgrowth of intestinal autointoxication, condensed from Dr. Combe's masterly work, "Intestinal Autointoxication."

Drawn features, sad expression, skin yellow or pale, dryness of the hair, ends of the hair split, scaly scalp, sunken eyes, whites of the eyes yellow or dingy, brown discoloration of the eyelids, cheeks, or other portions of the skin; lips red and congested, redness increased during acute attacks, sometimes swollen and hot; chest emaciated, abdomen bulging or contracted; nails soft and brittle, transverse notches indicating acute attacks of toxemia; sometimes white patches on the skin of the neck or armpits; glands in the groin enlarged, movable but not sensitive; general perspiration or perspiration of the hands and feet, especially during sleep. Loss of appetite, irregular appetite, abnormal appetite, often disgust for meat, desire for plaster, sand, twine, earth, ravenous appetite; feeling of tightness at the waist after meals; colic, abdomen swollen, veins of the abdomen dilated, especially about the ninth and tenth ribs. In young children, liver often enlarged. Sometimes contraction of the pylorus; often contraction of the colon. Attacks of vomiting and diarrhea, bilious attacks, attacks of jaundice, pain in the region of the liver, hardening of the liver, hemorrhoids, abdominal dropsy, gall-stones, rapid pulse, symptoms resembling angina pectoris, pulsations throughout the body, sensations of heat, palpitation of the heart, abnormally slow pulse, subnormal temperature, sensation of coldness in the extremities, nosebleed, high blood-pressure, swelling of the eyelids on awakening in the morning, swelling of the ankles, neurasthenic symptoms, migraine, sick headache, loss of memory, especially for proper names. Epileptoid attacks, tetany, mental disturbance, impoverished blood, pernicious anemia, senility, premature whiteness of the hair and beard, incapacity for muscular exercise, dwarfed growth, nanism; various skin diseases, especially prurigo, itching, eczema, and other eruptions, urticaria, acne, and boils.

The essentials of the plan of treatment developed and carried out in this institution in combating autointoxication, as a result of more than thirty years' experience, are as follows:

1. By proper feeding to starve out or hinder the growth of the poison-forming anaerobes. The aerobes, or acid-forming organisms, feed upon carbohydrates, such as starch, sugar, and dextrins. The sugar of milk and malt sugar are the best of all foods for these acid formers. On the other

hand, the anaerobes feed upon proteins. Meat is the substance which best promotes their growth, because it not only supplies the nourishment upon which they thrive, but also introduces into each morsel swallowed many millions of these poison-forming organisms or their spores. Eggs also favor their growth, especially the white of egg, and fish and oysters still more than beef, mutton, and flesh of other warm-blooded animals. Carefully conducted experiments have shown that animal fats also encourage autointoxication,—good sterilized butter less than the average fats, and vegetable fats to a much less degree. It is clear, then, that an antitoxic diet must exclude meats of all sorts, and especially eggs. In some cases even milk must be discarded, because casein dyspepsia (Combe) is present.

Four grades of antitoxic diet are employed. One of the most effective means of combating this infected condition of the intestine is fasting; but this is seldom required, and it is found that absolute fasting is less effective than a carbohydrate diet, with the exclusion of proteins and fats for a short period. The latter plan is the outgrowth of practical experience, and when required, which is only in extreme cases, it works exceedingly well, clearing the tongue quickly, and restoring the lost appetite. Proper bulk is secured by the use of Japanese seaweed, a substance which, while indigestible, is unirritating and highly hygroscopic, and not acted upon by bacteria. It serves a most useful purpose in collecting and removing the foreign bacteria which swarm in the mucus of the infected intestine. A few days (two to four) of this regimen accomplish more in clearing the tongue and removing symptoms directly due to intestinal autointoxication than two or three weeks of fasting. In fasting, the symptoms of autointoxication often increase because of the development of toxin-forming bacteria in the retained secretions (mucus, bile, and intestinal fluids), which are an excellent culture media for many anaerobes.

After a few days of this regimen, a balanced but low protein ration (Antitoxic Diet No. 1) is given the patient, excluding, however, not only meat, but also eggs and milk, as well as other foods (even vegetables) rich in proteins. Fats are also taken sparingly, the only fats allowed being vegetable fats and sterilized butter in moderate amount.

After a week or ten days the dietary is enlarged to include fermented milk preparations (Antitoxic Diet No. 2), and as the symptoms improve, fresh vegetables, sterilized milk and cream, and other foods in considerable variety are added (Antitoxic Diet No. 3).

The several graduated dietaries employed will be found in the "Battle Creek Sanitarium Diet List," of which mention has already been made.

Antitoxic foods not only deprive noxious micro-organisms of the nutriment essential to their growth and activity, thereby reducing these dangerous elements both in number and in virulence, but feed the acid-forming aerobes, promoting their growth and acidifying the intestinal contents, and thus inhibiting the growth and activity of the poison-forming anaerobes.

This simple means enables us to bring into therapeutic operation a great biologic principle whereby we combat deadly pathogenic bacteria with friendly bacteria, and by thus changing the flora of the intestinal tract, we eliminate a veritable Pandora's box of disease-producing elements which all curative means heretofore known have been quite powerless to control.

2. Of almost equal rank with the antitoxic dietary as a means of combating intestinal infection, are means for promoting normal intestinal motility. Stasis, except in the rectum, greatly favors putrefaction of the intestinal contents. By hastening the movement of decomposable material along the intestinal tract, the acid-forming bacteria of the small intestine are swept on into the colon while still active, and the poison-forming anaerobes of the lower bowel are discharged from the body in copious loose movements. A very laxative diet is required in many cases. In some cases, to give bulk to the fecal mass, Japanese seaweed is administered with the meals daily for several weeks or even months. The bowels should be made to move three or four times a day.

If necessary, the enema is employed as a supplementary measure,—water, soap and water, oil, or all combined may be indicated. Manual Swedish movements to empty the colon and strengthen the abdominal muscles are also employed, and special colon massage under the guidance of X-ray examinations. Galvanism to the abdomen and the sinusoidal current to the rectum and abdomen are serviceable measures, as are also various hydriatic applications which stimulate peristalsis and lessen portal congestion.

3. The anaerobes, which are the chief agent of intestinal autointoxication, may be successfully antagonized, as shown by Metchnikoff, Tissier, Combe, and many others, by feeding the patient massive cultures of aerobes in the form of buttermilk, kumiss, kephir, and even sour milk. Best of all the fermented milk preparations is Yogurt, a Bulgarian milk preparation which contains the most active and resistant acid-forming bacillus yet discovered (Massol, Metchnikoff). This preparation is daily used, in dealing with cases of this sort, in quantities of several hundred pints. A certain proportion of patients can not make use of milk in any form on account of casein dyspepsia (Combe). In such cases the ferment is given in concentrated pure culture, in tablets. By thus sowing the intestinal tract with harmless and friendly bacteria, the "wild" and pathogenic, poison-forming bacteria are driven out.

The use of this remarkable ferment has been known in the Orient for many centuries. Its properties have been studied by Massol, of Geneva, and especially by Tissier of the Pasteur Institute, and it is now in great vogue among the leading practitioners of continental Europe, although as yet little known in this country.

4. Autointoxication is also combated by all the usual tonic means by which vital resistance may be increased,—tonic baths, outdoor life, massage, electricity, and various other tonic and restorative measures.

5. These cases very frequently present unquestionable evidence of the existence of colitis, in the passage of characteristic shreds and membranes. Special treatment of the colon is often employed in these cases and with most excellent effect.

No class of cases is treated with more satisfaction than these cases of chronic intestinal autointoxication. Under the influence of the combined measures above outlined, improvement quickly appears. The tongue clears, the skin loses its dingy hue, the stool becomes less putrid, and the bacterial count notably less. The urine contains a smaller amount of putrefaction

OUTDOOR GYMNASIUM

products, a gain in weight takes place, and there is a still more marked gain in strength. Depression and various symptoms of neurasthenia disappear, and the patient sees himself getting well. Improvement is often most gratifying even when a pronounced cachexia exists as the result of the chronic intestinal autointoxication which is nearly always present. Even in cases in which arteriosclerosis has developed, or in which there is marked disease of the liver and kidneys, great service may be rendered the patient by the arrest of the disease and the amelioration of his symptoms, even though a complete cure is impossible. The liver diminishes in size under treatment, the albumen disappears from the urine, the coefficient of renal efficiency rises, edema disappears, the patient gains in flesh, and so long as the prescribed antitoxic regimen is faithfully adhered to this improved condition continues for some time, even years.

Digestive Disorders

By the aid of the exact method of gastric analysis originated by Hayem and Winter, the work of this department was many years ago placed upon a sound scientific basis, and has been in continued operation and with increasing success ever since. The remarkable facts developed by the experimental work of Pawlow, which have been made available within recent years, have rendered possible an additional and very great advancement in dealing with this class of disorders.

Visits to the laboratories of Pawlow and other eminent European investigators aid in keeping this department abreast of the most recent progress in special lines of research.

Careful gastric examination is of course made in every case before a systematic course of treatment is begun. By means of thoroughgoing fecal examinations, information is obtained not only concerning the digestive work done by the stomach, but also respecting pancreatic and intestinal digestion; and thus is obtained a thorough knowledge of the whole chylopoietic system. The exhaustive examination of food residues which is made in this laboratory not only throws light of the highest value upon the condition of the digestive process, but reveals in many cases the real cause of functional and organic changes in remote parts of the body.

The importance of thorough mastication is insisted upon. It is often no small task to train a patient out of wrong habits of eating, but when he sees everybody about him "fletcherizing" each morsel of food to a finish, he soon catches the habit.

Many wrong habits of life must be corrected. In the cases of women a reconstruction of the dress is often required.

The patient must be able to sleep well; the elements of worry must be eliminated by the aid of rational psychic and mental therapeutics. Patients are taught that, as Dr. Gulick has so well said, "Worry is nothing but a diluted, dribbling fear, long drawn out." "Fear-thought," to use Horace Fletcher's expressive word, is a most depressing influence, and must be avoided as a mental and moral poison. Exact methods of investigation render possible an accurate prognosis in nearly every case; so that those who are encouraged to remain may generally receive the most positive assurance that good results will be realized. The ability to hold out definite

and positive hope of recovery often accomplishes more for the patient than anything else that could be done for him. It enables him to get his eyes off the cemetery and his face set healthward; and the quickly developing evidence of improvement, the detection of which is rendered possible by accurate means of diagnosis, furnishes solid ground on which to base a further growth of confidence.

A factor of the Battle Creek Sanitarium System which is highly essential in the successful treatment of this class of cases is the calorimetric system of diet. This system consists of the following:

1. A menu consisting of several hundred dishes having the qualities necessary to render them at once palatable, digestible, nutritive, and adapted to the various maladies and morbid conditions presented by a large and miscellaneous medical clientele.

2. Exact knowledge respecting the caloric value of each of these articles, and of the several food principles contained in each. The building up of such a menu is no small task. The recipe or formula of each dish must be worked over in a laboratory kitchen by experts until perfect as it is possible to make it. Then the calory estimations must be made by the bomb calorimeter, combined with the usual methods of food analysis. In the beginning, this work was much facilitated by the very exact study of raw and cooked foods made by the U. S. Department of Agriculture. The use of standard tables, however, is necessarily a more or less inaccurate method, and it was soon found necessary to carefully revise and check the estimations of values by means of the bomb calorimeter and original analyses. Foodstuffs are constantly fluctuating in nutritive value and composition, so it is necessary to employ one or more experts in chemical work to maintain a sufficiently approximate degree of exactness to give satisfactory results.

3. The menu is now ready for use; but its value depends wholly upon scientific accuracy on the part of the cooks. Each formula must be compounded with the exactness of a pharmaceutical prescription. The kitchen must become a chemical and physical laboratory. The cooks must be experts in the culinary art and conscientious so that they can be relied upon to the last degree. The chef must be a man of unusual intelligence, large and varied experience, thoroughly faithful, loyal, and conscientious, and besides this, he must have had special laboratory training such as cooks and chefs usually know nothing about, and generally would be quite unable to receive, because of insufficient education.

Over all must be a dietitian who has probed deep into the science of nutrition and the chemistry and physics of foods and food preparations.

4. With all these requisites, scientific food may be scientifically prepared. The next thing is the apportioning and serving. In the preparation, the nicest care has been taken to make each dish of standard quality and nutritive content; all this painstaking effort will be lost, however, unless the apportioning is done with such mathematical accuracy in measuring and weighing that each patient served will get the exact amount for which his prescription calls. In no other way is it possible to regulate the diet quantitatively. Accuracy in apportioning is secured by means of conveniently arranged balances and specially made measuring cups and

dippers. Intelligent and well-trained persons are employed for this work, and a physician is detailed to watch the serving during meal hours.

5. The next problem is the construction of the daily bill of fare. A monotonous or too much restricted dietary is not conducive to the production of "appetite juice." The menu must be varied and the patient must have the liberty of choice. This is accomplished by prescribing for the patient under the number of calories or food units in total, or for each food principle, as the case may require.

For example, a patient who requires 2,000 calories per diem will be instructed to take 200 calories of protein, 600 calories of fat, and 1,200 calories of carbohydrates, rather than a prescription respecting the exact amount of bread, rice, butter, or other foods that he should eat.

The patient, of course, receives general instruction respecting the foods that are specially indicated in his case, and those which should be avoided, as may be necessary; but he is thus allowed much latitude in the arrangement of each individual meal, and so does not feel restricted. The menu is conveniently arranged so that the patient may check each article ordered or eaten, and at the beginning or close of the meal he simply adds up the figures opposite the articles checked, and the total is the number of calories eaten.

Patients are often surprised to find themselves taking only half the amount absolutely needed for maintenance, and they see at once the reason why they are losing flesh. They also see at once the only way in which the loss can be made good, and their cooperation is thus secured.

A medical dietitian is always at hand to give advice and assistance to newcomers as may be needed; but the first three days at the diet table during the research period is usually sufficient to initiate the patient into the mysteries of the bill of fare and to get him started in the scientific study of his nutrition.

6. The marked menu is a record of the patient's meal, which may be filed for future reference. The patient records the caloric totals on the blank in his prescription book provided for the purpose. This he shows to his physician, who is thus enabled to keep close track of his dietetic conditions.

Experience during more than five years has shown that it is possible to feed a thousand persons three times a day from a single kitchen, and to know to a very close approximation the number of food units consumed by each.

This is the Battle Creek Sanitarium calorimetric system in a nutshell. The diet tables employed and extended dietaries, together with tables prepared from the U. S. Government tables of food analyses, are published in the "Battle Creek Sanitarium Diet List," and will be found in the Appendix. By the aid of this system, the physician may know at a glance whether his patient is taking a high or low protein diet, too much or too little fat, and whether or not he is following his prescription.

The dry, bloodless skin of the dyspeptic must be made active and vascular, thus relieving the congested stomach and liver. The prolapsed stomach and other viscera must be replaced and retained in position by suitable abdominal supporters and by strengthening the abdominal mus-

AN AFTERNOON ON THE LAWN

THE CHAPEL

cles by massage, special exercises, "movements," and the sinusoidal current. Irritated sympathetic ganglia must be relieved by suitable applications to the abdomen. Derivative and tonic applications of various sorts must be made.

All measures for improving the general bodily health which are applicable to the case in hand must be employed, for we must rely upon the body itself for actual cure of the digestive disorder.

Specific disorders of the nutritive tract require the application of specific means. Those employed in some of the more common conditions will be briefly described.

Hyperhydrochloria or Acid Dyspepsia

This condition, formerly too often attributed to fermentation in the stomach, is, in fact, rarely accompanied by fermentation. It is the result, as is now well known, of an excessive formation of acid. The following are the essential features of the method employed in dealing with this condition:

1. A dietary which will suppress the formation of hydrochloric acid and encourage the development of pepsin so as to increase the utilization of the acid formed. This is accomplished by the employment of well-dextrinized cereals. Foods predigested with diastase are found useful in some cases.

All food should be taken in the form of a thick puree which can be swallowed without chewing. It should be chewed very little or none at all. The purpose is to introduce the food into the stomach in such a manner that it can easily pass on into the intestines and so avoid the stimulation of the stomach which naturally results from the presence of food. The patient is cautioned to avoid chewing or fletcherizing, as this produces appetite juice and encourages excessive gastric acidity.

It is noticeable in most of these cases that the bowels are very inactive, hence the importance of calling special attention to securing proper activity of the intestine. Among primitive people much attention is generally given to the care of the bowels, which move three or four times a day, or after each meal.

Butter made from cream which has been thoroughly sterilized is tolerated by most patients, although Combe and other investigators have shown that vegetable fats are more easily digested and assimilated than animal fats, and are less likely to encourage intestinal autointoxication, which is often present in these cases. The butter used on the Sanitarium table is prepared fresh daily in the Sanitarium creamery from cream removed from fresh milk by a centrifugal separator, then sterilized, cooled, and churned thoroughly, and washed. Such care is taken in the preparation of this butter that it may be kept perfectly sweet for months without ice.

Fresh, pure olive oil and nut oils are found very acceptable to many patients, agreeing better even than sterilized butter. Certain nuts and nut preparations are also found of service, especially almonds, pecans, Turkish hazelnuts, hickory nuts, and fresh walnuts.

In cases in which the amount of acid is very great, foods rich in both proteins and fats are employed for a short time, being generally given in the form of purees. Sterilized cream gluten gruel and malted nuts are found to be particularly useful for this purpose. The vegetable fat suppresses HCl secretion, the excess of protein absorbs and neutralizes the gastric acid set free, while the liquid form reduces to a minimum the length of time the food remains in the stomach, thus giving the irritable membrane a therapeutic rest. This end is still further met in extreme cases by giving the food in frozen form.

Tea, coffee, condiments, pickles, and in some cases, for a time, even acid fruits, are suppressed. Meats of all sorts, bouillon, and meat extracts of every description are carefully eliminated, for the reason that they powerfully excite acid formation, as shown by Pawlow,—an observation which has been confirmed by other laboratory investigators as well as by clinical experience. Sodium chlorid is restricted, and in severe cases a dechlorinated diet is employed for a time.

The patient is required to rest one hour after each meal, avoiding sleep.

The scientific arrangement of the diet system previously described is of great service in these cases. It enables the patient as well as the physician or nurse to see at a glance which articles on the bill of fare contain the food principles required by his condition, thus giving the patient all the latitude possible in selection, while still keeping in line with his prescription.

2. The patient is advised to drink hot water an hour before meals and about two hours after meals, but to avoid much fluid at meal-time.

3. Hot applications are made over the stomach and spine opposite for relief of pain. The moist girdle, combined with a very hot application over the stomach, renders valuable service when vomiting and gas formation are prominent symptoms. The electric-light bath or some other form of vigorous sweating bath, applied two hours before dinner, lessens the formation of acid. The visceral congestion which leads to excessive secretion is also diminished by massage and muscular exercise. General cold applications are employed cautiously, as they stimulate acid formation. Cold applications are of very short duration, care being taken to secure thorough reaction immediately following the bath.

A preparation of gluten, with which is combined a definite proportion of protein, is recommended as a means of neutralizing the excessive acid in these cases. The acid combines with the gluten and thus becomes incapable of attacking the gastric mucous membrane, which is the cause of pain and ulceration.

The most extreme cases of hyperhydrochloria are found to yield to the thorough application of these measures.

Hypohydrochloria

Most of the indications are essentially the opposite of those of hyperhydrochloria.

Highly peptogenic foods must be employed. The foods must be well relished, but condiments render no service, as hypohydrochloria is one of

the conditions resulting from excessive stimulation. The stomach is worn out and must be given as easy a time as possible, and its energies must be reinforced by natural agencies, but not by artificial stimulation. The experimental kitchen and food laboratories of the institution, which have been in operation for more than twenty years, are continually turning out new and tasty dishes and food products in which appetizing qualities are produced by developing natural peptogenic and gustatory properties. These are the most powerful of peptic stimulants, and produce no ill effects, as do artificial stimulants, such as condiments. The motility is generally low, hence the greatest care must be taken in the thorough mastication of food.

As constipation is commonly present, peristalsis is promoted by the free use of syrupy malt preparations and other laxative foods. Malt extracts are also beneficial by their peptogenic properties.

Prolonged and thorough mastication of appetizing foods develops appetite juice, which Pawlow has shown to be the most important element of the gastric juice.

The ice-bag is applied to the epigastrium for a few minutes half an hour before meals to stimulate the solar plexus and thus increase appetite and secretion. Half a glassful of cold water an hour before eating is generally useful for the same purpose. Appetite generally develops quickly as the result of the increased rate of movement of the intestinal contents and improved assimilation.

Appetite, secretion, and motility are encouraged by short, cold baths, beginning with cold frictions and carefully increasing the vigor of the treatment as the patient acquires ability to react and thus to enjoy the application.

Massage of the stomach, both manual and mechanical, massive vibration, the application of the sinusoidal electrical current to the abdomen and sometimes to the interior of the stomach, the moist abdominal bandage applied at night over the stomach, the abdominal supporter when the stomach is prolapsed, phototherapy, the outdoor life, sleeping in cool, fresh air,—these are all effective methods which, when applied simultaneously, rarely fail to effect definite and most gratifying results.

In many of these cases, the stomach never recovers its ability to produce gastric juice in normal quantities, although a few recoveries have been observed under treatment.

The attempt was formerly made to treat these cases by administering hydrochloric acid in solution, but this plan was soon found to be impracticable, because it was necessary to dilute the hydrochloric acid to such a degree as to render it of little value to the stomach. Even then there was considerable danger of damage to the teeth and other sensitive parts. To obviate this difficulty a special preparation of vegetable protein is provided which holds a considerable quantity of hydrochloric acid in a loose combination that is readily broken up by the stomach. Hydrochloric acid taken in this way produces no harmful effects and enables the stomach to do its normal work in digesting the food and passing it along to the small intestine. By this means as much hydrochloric acid as is needed in the stomach can be supplied even in cases in which the stomach is unable to make any acid whatever.

VIEWS ABOUT THE LAWNS

The value of this acid protein is appreciated when it is remembered that the gastric juice not only aids in the digestion of proteins in connection with pepsin, but also disinfects the gastric contents, regulates the movements of the pylorus, stimulates the influence of the bile and the pancreatic juice, and activates the intestinal ferments.

Apepsia—Achylia

When the gastric function is wholly suspended, the glands no longer secreting either pepsin or hydrochloric acid, it can hardly be expected that there will be a restoration of normal function. The problem to be solved in such a case is how to enable the patient to tolerate his crippled stomach; rather, how to get along without his stomach; to be well in spite of its inactivity.

In most cases this is possible. The diet must be confined to such foods as do not require gastric activity; hence flesh foods must be wholly proscribed. Fats, and especially animal fats, must be used very sparingly and in a state of emulsion, for Cannon has shown that fats remain longer in the stomach than any other food element; it is known also that fat lessens the secretion of gastric acid (Pawlow), and hinders the action of the saliva and gastric juice upon the foodstuffs. Salivary digestion proceeds well in the apeptic stomach.

In cases in which the bacteriological examination of the stomach fluid shows great infection, it is sometimes found best to confine the patient's diet to yogurt buttermilk almost exclusively for a time. Remarkably satisfactory results are often obtained by this plan of feeding in conjunction with measures for building up the general vital resistance. For instance, in a case under treatment, in which twenty-five million germs were found in each cubic centimeter of the stomach fluid, the bacteria wholly disappeared under a sterile and antitoxic diet.

The patient is required to follow permanently a strictly antitoxic diet.

The success attained in the treatment of these cases is most gratifying. The patient may be assured of a practical cure if willing to follow instructions carefully and perseveringly. In not a small proportion of cases the evidences of chronic inflammation, mucus, membranes, shreds, etc., disappear in a few weeks, a gain in weight begins, the blood and general appearance improve, the bacterial count lessens, the proportion of anaerobes in the intestinal flora is shown by the gram stain to markedly diminish, and the patient finds ample ground for encouragement that he is on the right road to recovery.

There are, of course, cases of anhydrochloria for which nothing can be done. When the gastric mucous membrane has undergone complete atrophy and chronic intestinal autointoxication has continued its ravages for so long a time that the liver, spleen, kidneys, and other vital organs have been extensively damaged, little more can be done than to lessen the patient's discomfort by exact adaptation of foods to his crippled digestive organs, and by the employment of such sustaining treatment as he is able to receive. Anhydrochloria due to malignant disease of the stomach is also an incurable condition, but much can be done to relieve the sufferings

VACUUM LIGHT DEPARTMENT

of these patients, when the disease has advanced so far as to render operation inadvisable, by the employment of a bland and strictly antitoxic dietary.

Disease of Gall-Ducts and Gall-Bladder

Infectious jaundice or inflammation of the biliary passages accompanies intestinal autointoxication, and is a result of an extension of the anaerobic infection of the intestine to the liver through the portal vein and biliary passages.

Attention is especially given to the gastric and intestinal catarrh with which the disease is usually associated.

Thorough antitoxic treatment is found effective in these cases. The diet and general methods used in intestinal autointoxication are found rapidly effective in these cases, and have effected permanent cures in numerous cases which had been regarded as proper subjects for surgical operation.

The sweating electric-light bath and the prolonged neutral bath relieve itching; so does sponging with very hot solutions of common salt or soda. Water drinking to the extent of three to five pints daily and abdominal massage are indicated. Gallstones, if present, are sometimes dislocated and discharged. The chief measures employed are the electric-light bath, neutral saline bath, and very hot saline sponging to relieve itching; arc light to the trunk, fomentations, thermophore, photophore, or other thermal applications over the liver and abdomen two or three times daily, followed by heating compress during interval to relieve pain, encourage leucocytosis, and improve the circulation of the splanchnic area; the enema at 90° to 75° once or twice daily, to aid intestinal antisepsis and to promote hepatic activity; strict antitoxic diet; tonic hydriatic measures to promote general vital resistance.

Simple infectious jaundice is always curable. If there is obstruction due to gall-stones, operation is, of course, required in addition to the treatment. The operation is much more likely to be successful if preceded by treatment to remove febrile condition and correct the intestinal autointoxication.

After operation it is highly important that the patient should be subjected to a thorough course of treatment to remove the causes which have given rise to the formation of biliary calculi, so that the diseased condition shall not return.

The fact that ten per cent, possibly more, of adults past middle age are carrying about stones in their gall-bladders without being in any way conscious of the fact, is evidence that the mere presence of gall-stones is not an indication for surgical operation. The disease often becomes quiescent and so remains indefinitely when the intestinal infection is overcome.

Recent investigations have shown that when gall-stones are formed in the gall bladder they are the result of infection, the original source of the invading bacteria being usually the intestine; hence in these cases it is highly important to give attention to intestinal asepsis. The patient is placed upon a thoroughly atoxic or antitoxic dietary. Cultures of protec-

tive microbes are employed, and peristaltic activity is stimulated by all rational means. Laxative drugs must be dispensed with, however, as these lower the resistance of the intestinal mucous membrane and so ultimately aggravate the morbid condition present, no matter how great may be the temporary relief afforded by their use. By means of laxative foods, the basis of which is a diet containing not less than 400 grains of cellulose daily, and by the use of such other known medicinal measures as the use of Ceylon moss, a hemi-cellulose, paraffin emulsion, colon massage, the cool enema, application of electricity to the abdomen and colon, hydriatic measures of various sorts, mechanotherapy, and special exercises for the development of the abdominal muscles, the bowels are made to move three or four times a day.

Constipation

The great majority of cases fall into one of four classes:

(*a*) Cases of constipation from atony or from dilation of the colon—a very common form—receive short cold applications externally, cool enemas, abdominal massage, colon massage, manual movements, and laxative diet, which includes vegetable fats, acid fruits, fruit juices, and various laxative preparations of Japanese seaweed and other special products.

The tone of the abdominal muscles is improved by massage, electricity, cold applications, sprays, and douches, short tonic sitz bath, the plunge bath, and especially swimming, gymnastic exercises, manual and mechanical Swedish movements. Enemas—oil, soap, glycerine, etc.—are sometimes helpful at the beginning, but are dispensed with as soon as possible, and the bowel systematically trained to normal action.

(*b*) In some cases constipation is due to spasm of the colon, generally marked by a contracted abdomen and oversensitive sympathetic ganglia. The contracted colon can often be felt through the abdominal wall. Spasm of the anal muscles from stricture or rectal irritation, hemorrhoids, etc., may be the cause. Hot enemas, 102° to 105°; hot sitz baths, 104° to 108°, three to five minutes; warm oil enema at night; radiant heat to the abdomen two or three times daily, and various other thermic applications to relieve sympathetic irritation and intestinal spasm.

The oil enema, administered at a temperature of 104° and in quantity of one to two or three pints, is better suited to these cases than the water enema. The latter often increases irritation, as shown by the increase in the discharge of mucus. These cases are very often accompanied by intestinal autointoxication, and require special treatment for this condition in addition to treatment directly addressed to relief of the constipation. The lack of gastric acid for sterilizing the food in the stomach renders very important the use of well-sterilized foods. Great benefit is also derived in these cases from the use of the Bulgarian ferment, yogurt. It is highly important, however, to avoid habituating the patient to mechanical emptying of the colon by means of the enema. Most excellent results are obtained by the use of Japanese seaweed administered with broth three times a day. This preparation, by its powerful hygroscopic properties, prevents

excessive dryness of the fecal matters, while at the same time furnishing bulk for the intestine to act upon.

Raw fruit and vegetable juices are often found especially effective in relieving constipation.

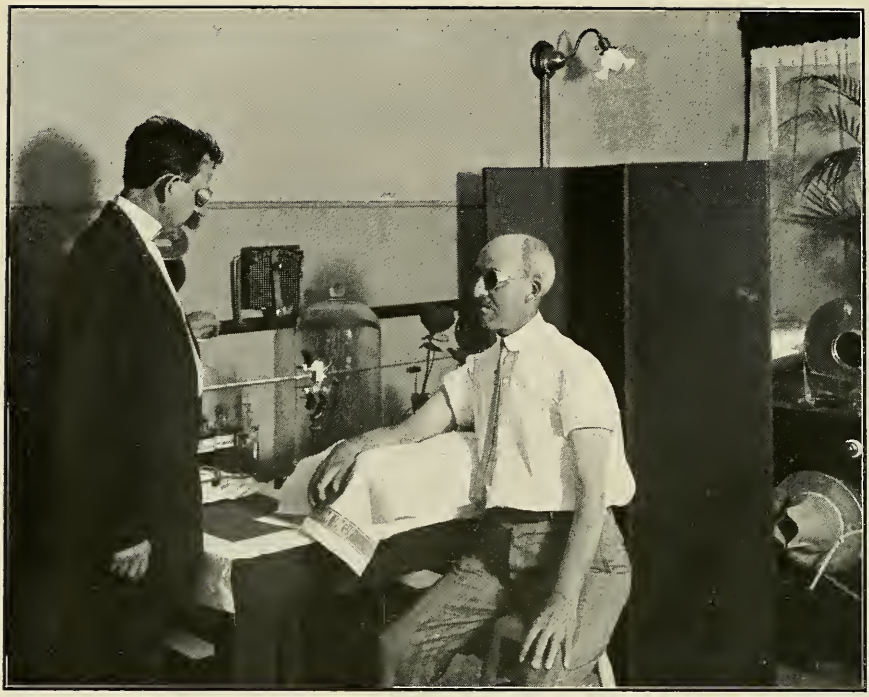
(*c*) Cases in which the constipation is due to redundancy of the colon.

In these cases the colon is usually both dilated and prolapsed. The measures above mentioned for overcoming dilation of the colon are used, together with special massage and manipulations for the replacement of the colon. Manual Swedish movements are particularly helpful in these cases. A suitable abdominal supporter should be worn. Careful regulation of the dietary, especially the avoidance of large quantities of coarse, indigestible material is important in these cases. The overstretching of the colon is not infrequently due in part to an excessive bulk of fecal matters.

(*d*) Cases of latent constipation, in which, although there is a regular movement of the bowels daily, the colon is never completely evacuated and defecation is one to three days or even more in arrears.

The stasis present in these cases encourages the growth of putrefactive bacteria and increases their virulence. After a time, the bacteria growing in the intestinal contents penetrate the mucous membrane, and chronic colitis is the result. These cases can be cured only by change of the intestinal flora and removal of all the causes of intestinal inactivity. The application of electricity is of the highest service in many of these cases by restoring the normal tone of the intestine. The recent (1911) observations of Cannon and Schwartz concerning the normal movements of the colon have thrown valuable light upon the subject of constipation. Cannon has shown that an atonic or over-stretched atrophic colon is incapable of contracting. In order that the colon may contract it must be in a "tonic" state. This condition often is absent as a consequence of infection of the intestine by putrefactive organisms. By changing the flora of the intestine, that is, by introduction of cultures of protective micro-organisms, especially cultures of the *bacillus bifidus* as proposed by Tissier, of the Pasteur Institute, and by the proper use of electricity, the tone of the paralyzed colon may be restored and thus normal peristaltic movements may be recovered, even after the most severe constipation has existed for many years. For the accomplishment of this purpose, electricity is applied by means of a long, specially constructed bi-polar electrode high up in the pelvic colon. By applications of the sinusoidal current, a tonic condition of the colon may be induced and by its means normal peristaltic activity is restored.

Radium, diathermy, and in certain cases various forms of internal application by aid of the rectoscope render valuable service in special cases. Every case of severe chronic constipation should be subjected to thorough examination by means of the X-ray and bismuth meal, and should also be subjected to a rectoscopic examination. In rare instances surgical means may be required to relieve a "Lane's kink," an adhesion due to paracolitis or diverticulitis or some other organic affection. In some cases operation is required for the relief of rectal disease, although



MERCURY VAPOR LIGHT

VACUUM LIGHT

the great majority of cases of rectal irritation, anal spasm, etc., may be relieved by non-surgical measures.

(*e*) Cases of obstruction due to stricture and some other mechanical causes must be relieved by mechanical means.

Here again the greatest service is rendered by a dietary system which is capable of being used as an instrument of precision. By a careful balancing of the daily ration and continuous use of the numerous special laxative foods provided by the bill of fare, definite results are speedily secured. The most obstinate cases often yield very speedily to this combination of peristalsis persuading remedies.

Special movements, so carefully graduated that they may be given to the feeblest patient, are of great service. They are made so carefully progressive that in a few weeks the patient will be able to take vigorous movements without injury and even with ease.

In most cases of constipation the colon is the chief seat of disease. It is very rare indeed that the constipation depends upon any diseased condition of the small intestine. A careful study of the colon by the bismuth meal and by the introduction of bismuth directly into the colon itself should be made in every case of chronic constipation. A glance at the radiographs of colons shown at pages 153-159 will be sufficient to indicate the importance of this examination.

Diseases of Women

In no class of cases is the physiologic method more suited and successful than in the treatment of the disorders of women, both acute and chronic. The teaching of Emmet and Peaslee more than forty years ago made known the great value of the hot vaginal douche. In both acute and chronic pelvic inflammations, the use of the tepid and the cold douche is equally valuable in proper cases.

The hot sitz, the revulsive sitz, the neutral sitz, and the prolonged cool sitz, when properly employed, secure results which could hardly be believed by those not familiar with the hydriatic treatment of this class of disorders.

In acute pelvic inflammations, the hot hip and leg pack, combined with the ice-bag, is a marvelously effective means of relieving pain and controlling inflammatory action, whether the part affected be an ovary, a tube, the uterus, or all of these structures.

Chronic inflammations and exudates left behind by acute inflammation yield to the persevering application of hydriatic measures in combination with electricity, massage, and other appropriate means, which succeed in a large number of cases in which operative procedures are often employed. Pains due to internal adhesions, the result of abdominal operations or other causes, are often cured by the faithful and persistent use of suitable measures, especially thermic and electrical applications.

By the thorough application of these physiologic measures, hundreds of women have been saved from a mutilating surgical operation, and in more than one instance have become the happy mothers of families after the removal of the appendages had been urgently advised as necessary to the recovery of health.

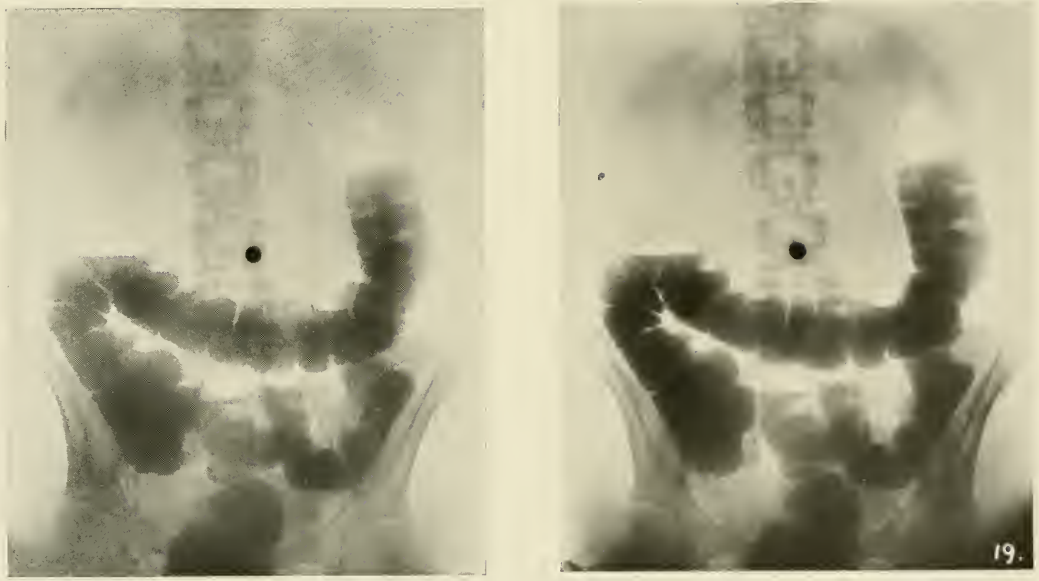
NORMAL COLON, FILLED BY BISMUTH ENEMA

DILATED, PROLAPSED CECUM, REDUNDANCY OF COLON

MARKED PROLAPSE OF COLON

COLON FILLED BY BISMUTH ENEMA SHOWING INCOMPETENT ILEOCOLIC VALVE

STEREORADIOGRAM OF PELVIC COLON SHOWING COURSE OF FECAL FISTULA BETWEEN SKIN OF RIGHT INGUINAL REGION AND THE SIGMOID (BISMUTH-FILLED)



STEREORADIOGRAM OF NORMAL COLON AFTER INJECTION OF BISMUTH ENEMA

Cases of amenorrhea which do not yield to the intelligent application of the combined physiologic method, are extremely rare indeed. It is not more difficult to overcome vasomotor spasm and induce a normal flow of vitalizing blood through the anemic, shrunken uterus of amenorrhea than to cause reddening of any portion of the external surface. The vaginal douche (both hot and cold), the revulsive sitz, the heating compress, abdominal and pelvic massage, the foot bath, and the Scottish douche, are powerful means of influencing the pelvic circulation.

Swimming, an art little cultivated by women, is wonderfully helpful in overcoming the causes of pelvic disease and fortifying the patient against relapse. Feeble patients must, of course, be carefully trained in preparation for this mode of exercise. Daily instruction is given in swimming, and there are but few patients who do not enjoy this delightful and healthful exercise after a week's training under an expert teacher for a few minutes daily.

Pools of different temperature are provided, so that none are exposed to the risk necessarily attendant upon sea bathing, in which the temperature of the water and other conditions are not under control.

Dysmenorrhea in every form may be wonderfully benefited, and in nearly all cases may be thoroughly cured by systematic local treatment combined with constitutional invigoration, relief of constipation, and improved pelvic circulation.

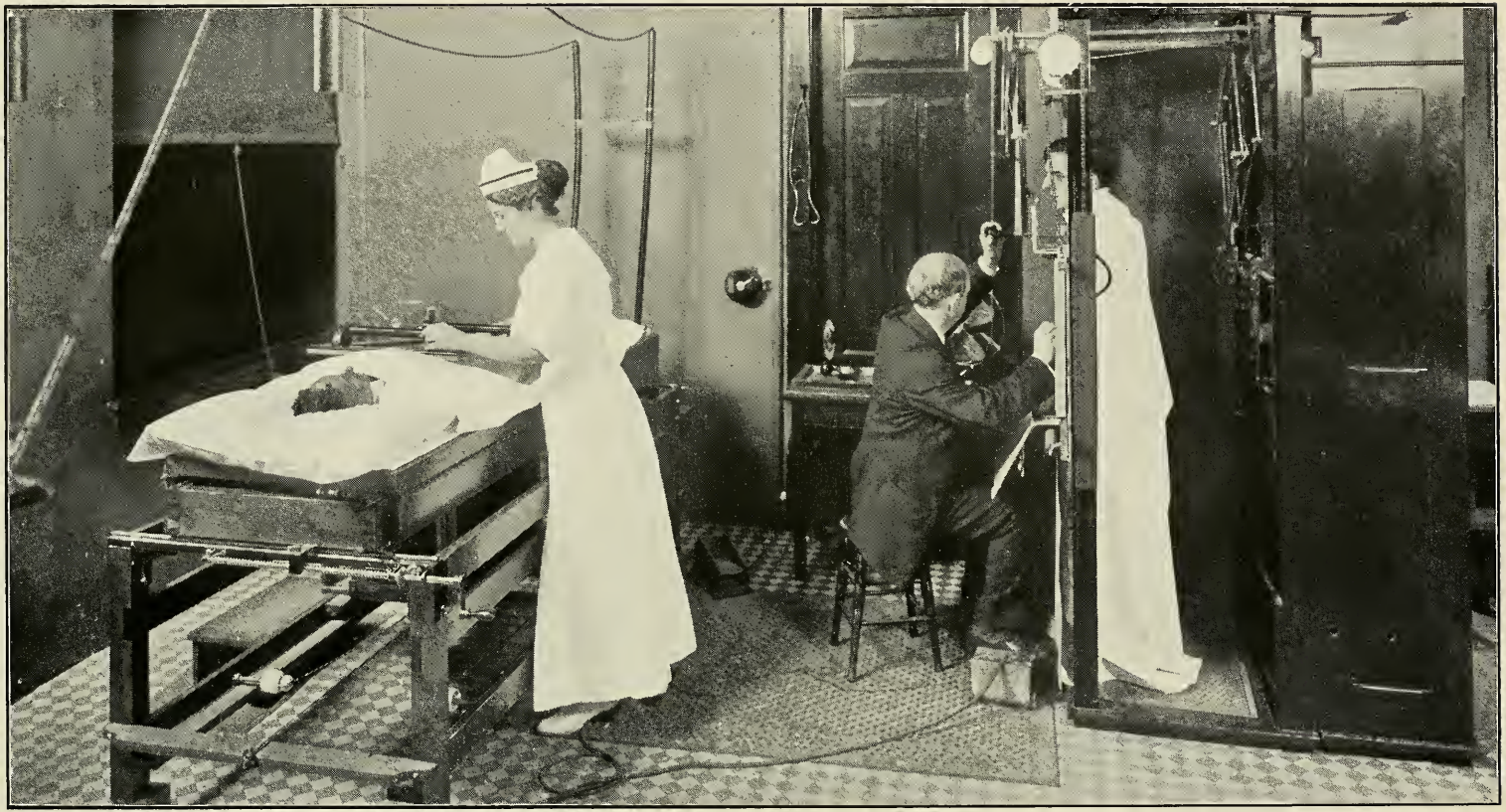
When some simple preliminary surgical procedure is needed, measures of after-treatment are still usually required to secure permanent improvement through restoration of normal conditions. Surgery alone is by no means uniformly successful in these cases, as most surgeons know by sad experience.

A careful inquiry will show that in a very large number of cases of chronic invalidism in women, in which the therapeutic efforts have been chiefly directed toward the pelvic organs, the real trouble is chronic intestinal autointoxication, and complete relief is obtained only by antitoxic treatment.

Nervous Disorders

While every case of hysteria is not wholly curable, improvement is always possible, and a complete cure is almost always attainable by intelligent, persevering effort, which includes thorough, all-round health culture and proper psychic management, as well as such physical treatment as may be indicated. The physiologic method provides for every possible indication in this class of maladies.

Various forms of paralysis yield excellent results to the physiologic system when other measures fail. In apoplexy due to degeneration of the cerebral vessels, the advance of the disease may be stayed, and a very great degree of improvement may be secured, even in most unpromising cases. Even in cases of paralysis due to degenerative changes of the cord, it is rare indeed that the progress of the disease may not be checked for a considerable time, at least, and in many instances vast improvement may be obtained.



FLUOROSCOPIC ROOM OF ROENTGEN DEPARTMENT

The measures found of special service are the cold mitten friction, the half-sheet rub, the shallow bath, the sinusoidal electric bath, the short electric-light bath followed by a cold towel rub or the Scotch douche, general and special massage, manual and mechanical Swedish movements, the application of the sinusoidal current in such a way as to exercise weakened or paralyzed muscles. Special attention is given to the regulation of the dietary.

In many cases there is high blood-pressure, and often a more or less advanced stage of arteriosclerosis. This especially demands the suppression of colon toxins, which is accomplished by the enema, disinfection of the colon, and an antitoxic dietary to suppress the development of bacteria and bacterial poisons, which doubtless are a powerful factor in causing this diseased condition.

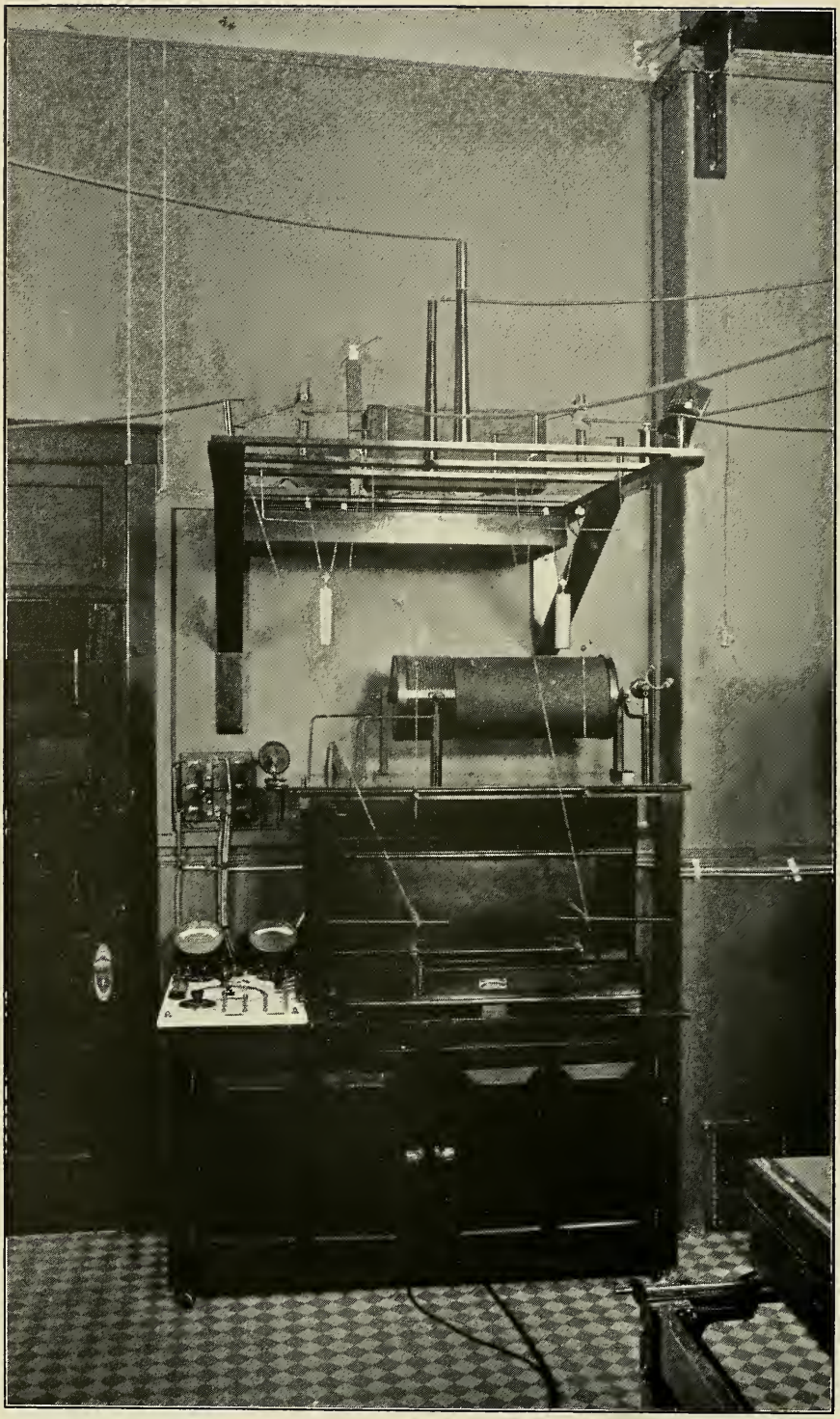
Neurasthenia

This so-called malady should be regarded as a symptom rather than as a distinct malady. The symptoms to which, in the aggregate, neurasthenia is commonly applied are the result of conditions which are the outgrowth of our perverted civilization. The cure requires a return to nature in habits and such a building up of the natural functions of the body as can be permanently secured in no other way than by the thoroughgoing, systematic application of the physiologic method.

The tonic results afforded by hydrotherapy are the most effective means known of restoring exhausted nerves. There are no drug remedies which compare with cold baths, which may be perfectly graduated by a series of systematized procedures, beginning with the simple application of cold water after a warm bath (such as the electric arc or radiant heat bath) by means of the hand of the attendant, and progressing through the salt glow, the effervescent salt rub, cold mitten friction, the effervescent friction, the cold towel rub, the wet sheet rub, the dripping sheet, the shallow bath, the Nauheim bath, the cold shower, the horizontal jet, and the cold plunge,—measures gradually increasing in vigor, also modified in duration to suit individual cases.

Massage, manual and mechanical Swedish movements, phototherapy, special feeding, proper psychic management, and the outdoor life are measures which rarely fail of success, even in most obstinate cases.

In not a few of these cases the real foundation of the disorder can be shown to be a chronic toxemia, and the colon is most frequently found to be the source of the poisons with which the system is flooded. Bacteriological examination of the feces frequently shows in these cases two to forty billion bacteria to the gram of dried feces, or one hundred to one thousand times the normal amount. A nervous system exposed to the influence of such an enormous amount of toxic matters must necessarily be more or less deranged. The antitoxic dietary of the Sanitarium is admirably adapted to the suppression of toxin formation in the alimentary canal. This special diet system renders easy the regulation of the amount of proteins and other elements with exactitude, and enables the physician, when necessary, to train the patient down to a very low protein ration without incurring



A CORNER OF THE ROENTGEN DEPARTMENT

risk of injury, since the isodynamic relations of the ration may be kept always within safe limits.

Insomnia

It is very rare indeed that this symptom does not speedily yield to the soporific influence of appropriate hydriatic measures. The neutral bath seldom fails to put the most obstinate cases into a restful state within thirty to sixty minutes, and it is not an uncommon thing to see a patient fall asleep within ten or fifteen minutes after entering the bath. Various other procedures are likewise helpful, and success is always expected, even in the most stubborn cases.

Measures long employed at this institution in dealing with this class of cases have within the past few years been introduced into several leading insane asylums in the country, where they are most successfully employed in cases of acute mania with insomnia.

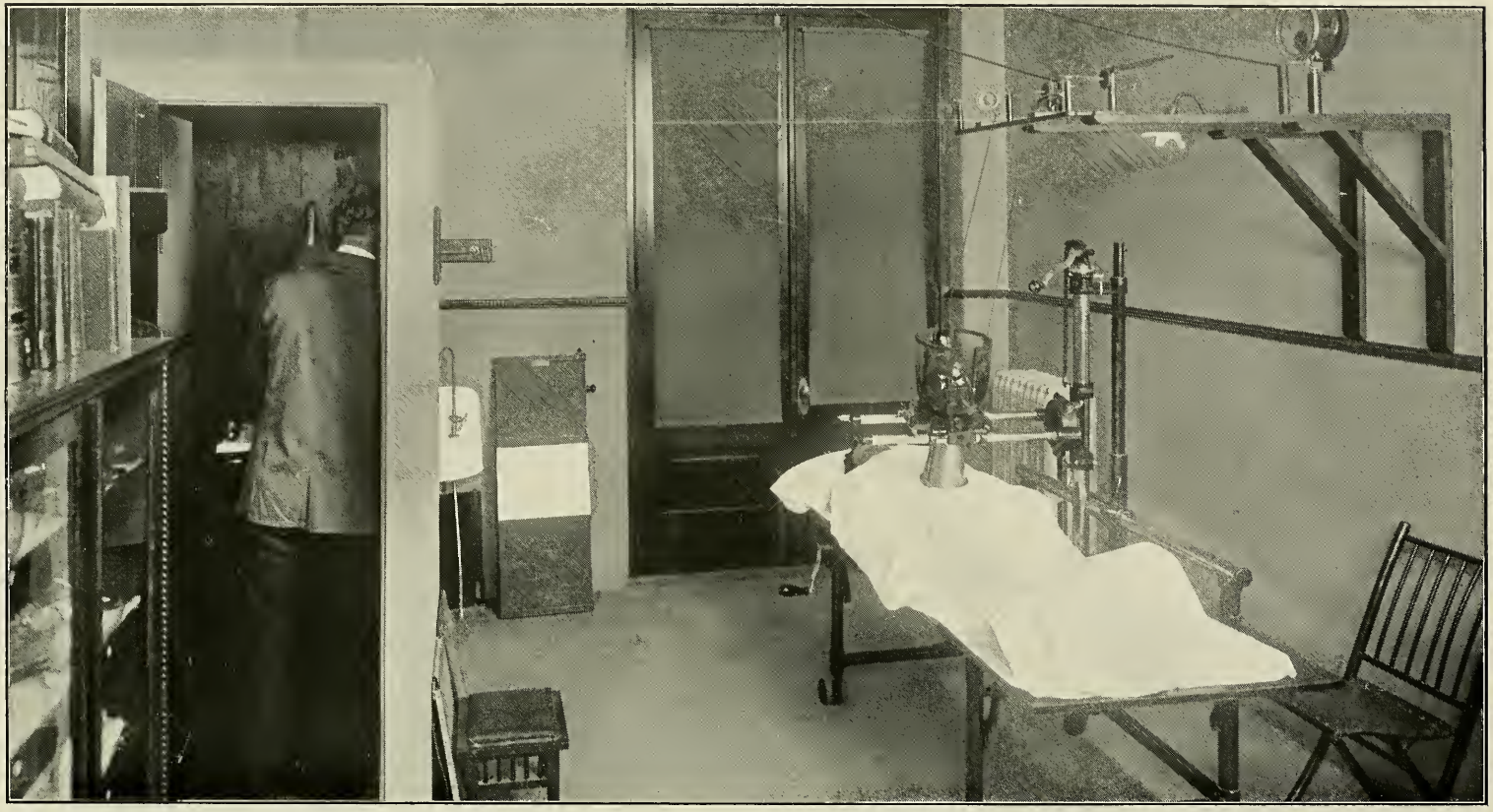
It may be truthfully said that insomnia always yields to the intelligent application of the combined physiologic method, which includes not only the neutral bath, but also the neutral pack, the moist girdle, the leg pack, the neutral douche, and also various electrical applications—static and galvanic,—massage, and manual movements, with proper dietetic regulation and open-air treatment.

In the great majority of cases of insomnia, the real root of the trouble will be found in intestinal autointoxication. The blood is filled with toxins, the result of bacterial action in the intestine, the brain cells are excited by these irritating substances, and insomnia is the result. No permanent cure can be accomplished in these cases without correcting the condition of the alimentary canal. The coated tongue and the foul breath, which are nearly always present in cases of chronic insomnia, are an evidence of this autointoxication. The use of hypnotics increases the autointoxication, and hence in the end aggravates the disease. This is particularly true of the bromids and allied drugs. A persevering application of the Battle Creek Sanitarium system rarely fails to cure the worst cases of insomnia.

Radium emanation, diathermy or thermo-penetration are found highly useful in many obstinate cases of insomnia. In nearly all cases great benefit is derived from the application of measures to increase intestinal peristalsis. When the patient has been trained to secure three or four thorough movements of the bowels daily, the disturbing toxins are cleared out of the body so thoroughly that the irritating effects produced by them disappear.

Locomotor Ataxia

This formidable malady, long considered incurable, yields in the great majority of cases most surprisingly satisfactory results. If the patient has not reached the very last stage of degeneration, muscular control can be regained and nearly every lost muscular movement can be restored, and he can be made able to walk with steadiness. Although the knee-jerk does not return, the disappearance of the ataxic and other unpleasant symptoms



ONE OF THE RADIOGRAPHIC ROOMS IN THE ROENTGEN DEPARTMENT

gives the patient ample reward for his effort. In the treatment of these cases it is, of course, necessary to take into consideration the stage of the disease and the condition of the patient.

There is no curative formula for this or any other malady. Each case must be treated on its own merits. The chronic autointoxication which clearly exists in some cases may be most successfully combated by means of the electric-light bath, short, carefully administered tonic hydriatic applications, the sun bath, the arc light, and the actinic ray applied to the trunk. The muscular wasting and general weakness may be ameliorated and often made to disappear rapidly under suitable applications of electricity, especially the slow alternating sinusoidal current, massage, and manual Swedish movements. By special gymnastics the law of co-ordination and movement is restored, and gradually the patient finds himself returning to a nearly normal condition, able to stand with closed eyes and to walk without staggering, and free from the lightning pains which have made his life miserable.

Diathermy is very valuable as a means of relieving the terrible ataxic pains which often resist the use of ordinary remedies. The use of radium emanation is also attended by a very considerable degree of success in these cases.

Bronchial Catarrh

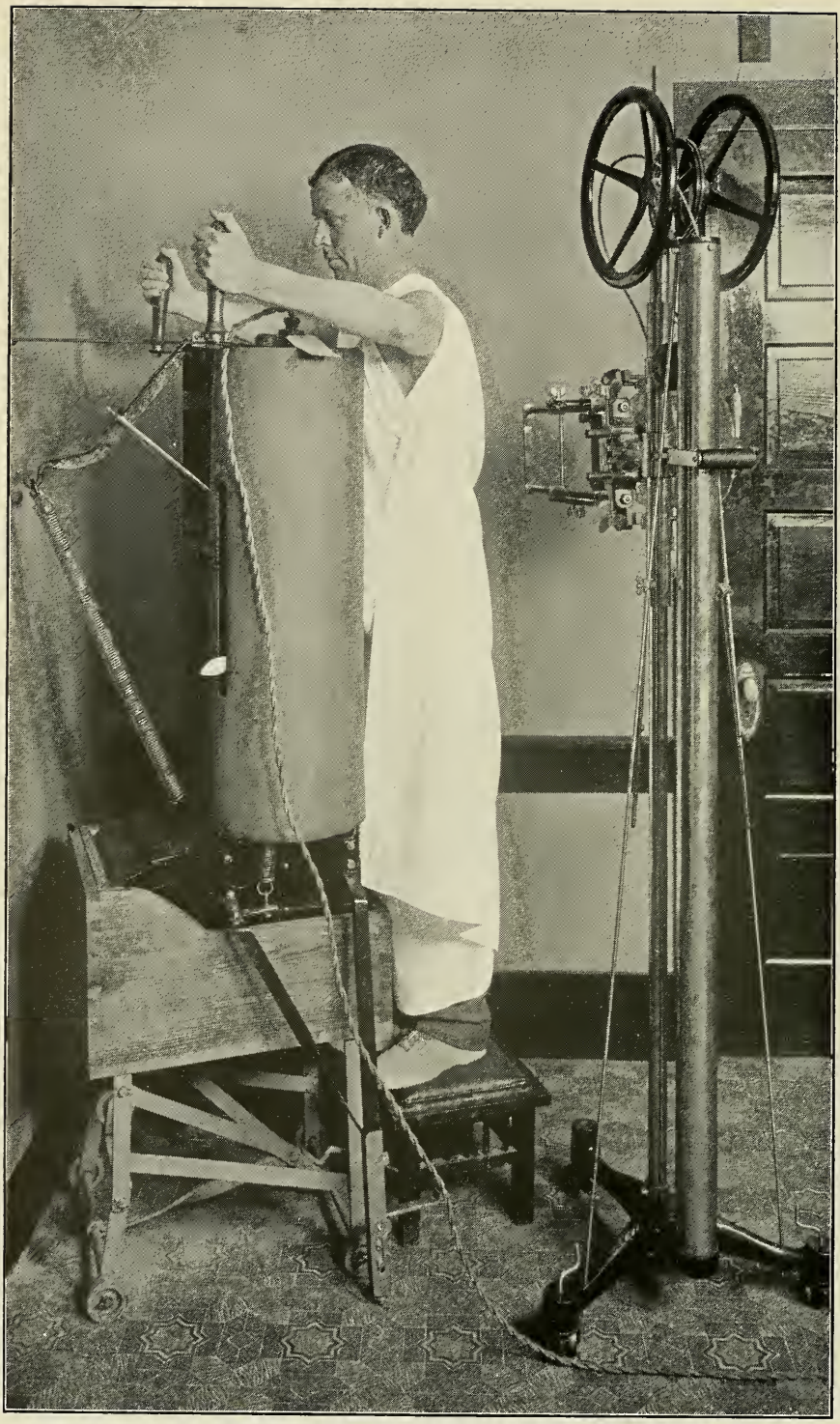
This obstinate affection usually yields quite readily to the Sanitarium system of management. The chest pack wonderfully relieves cough and pulmonary congestion, while tonic applications train the heart and skin to increased activity and improved nutrition. Massage improves the general circulation and metabolism; suitable applications of electricity develop the muscles of respiration; phototherapy, especially the actinic ray, applied to the chest, relieves local pain and congestion by producing a persistent hyperemia of the skin.

In many of these cases colon infection and autointoxication are found to exist. The improvement of nutrition by correcting the condition of the colon and the alimentary canal in general is not infrequently followed by a rapid lessening of the pulmonary symptoms.

The asthmatic symptoms frequently accompanying bronchial catarrh are generally quite commonly relieved by an application of diathermy, or thermo-penetration.

Bright's Disease

Different forms of chronic disease of the kidneys, commonly known as Bright's disease, if not always curable, yield most encouraging results. In many cases both albumin and casts disappear under treatment. This result may be expected in cases in which the treatment is applied in the early stages of the disease. If more advanced, much may be done to arrest the further progress of the malady and to prolong the patient's life by maintaining activity of the skin through the use of the electric-light bath and the various tonic applications carefully administered, together with a suitable dietary, active and passive exercises, and proper applications of electricity.



ROENTGEN CINEMATOGRAPH (ROSENTHAL)

The intimate causative relation of intestinal infection to this disease is now most clearly recognized. An antitoxic dietary, and such hydriatic measures as dilate the vessels of the liver and improve its nutrition, while at the same time relieving portal congestion, are capable of accomplishing more than might be regarded as possible. In the majority of cases, the further progress of the disease may be stayed and a very considerable degree of improvement secured, and in not a few cases the recovery is apparently complete.

The employment of the dechlorinated dietary is found to be very important in bad cases, being often followed by the disappearance of dropsical effusions, and general improvement in other particulars.

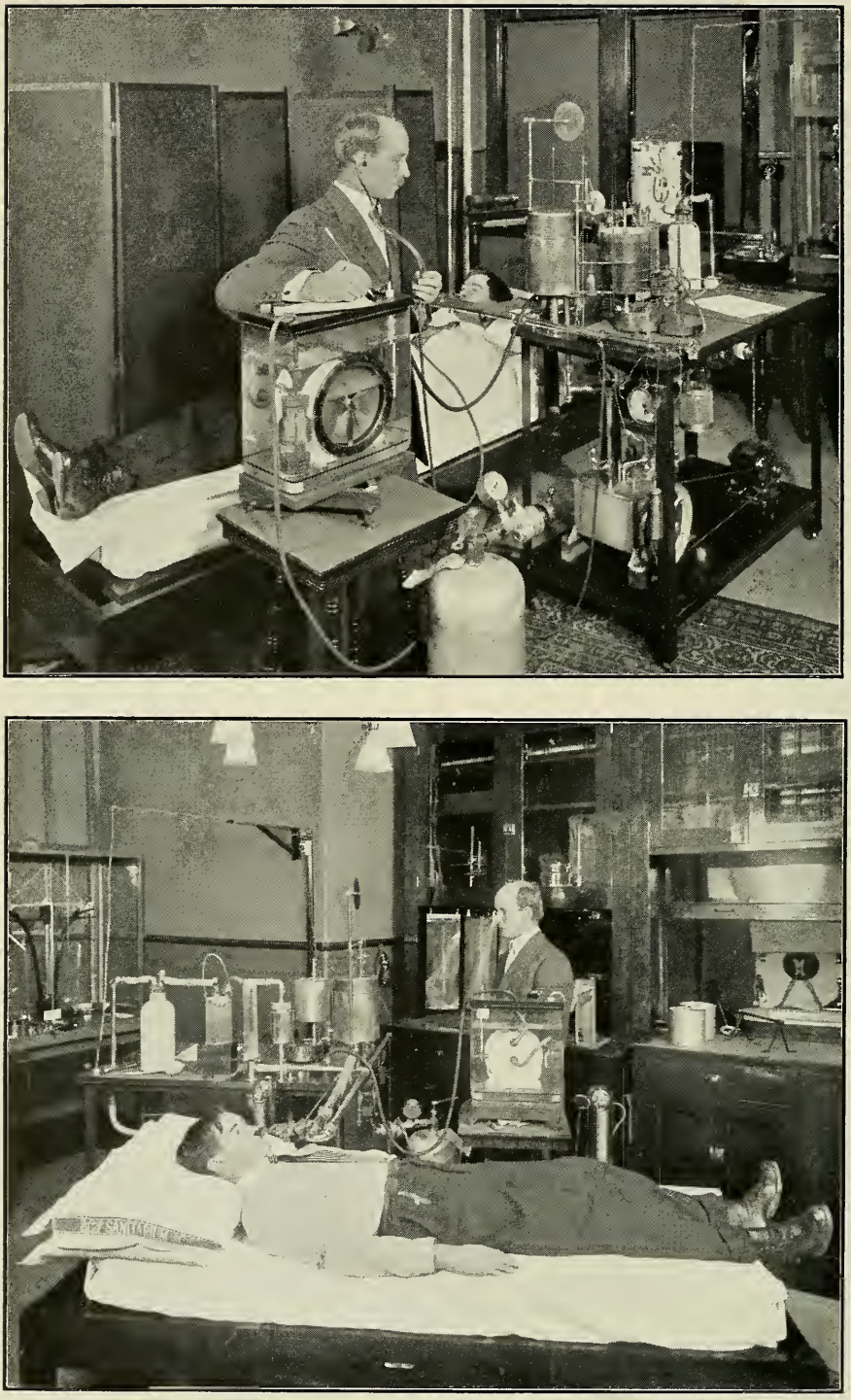
The recent discovery of the fact that changes in the blood-vessels are present in most cases of chronic intestinal nephritis, renders warm or neutral (not hot) baths, so-called Nauheim baths, and a large variety of other hydriatic applications made to the surface, of great value in promoting the activity of the skin, and so dilating the vessels as to lighten the work of the heart.

In beginning a course of treatment in these cases, exhaustive examination is made of the urine. The coefficient or renal efficiency is determined, with the other urinary coefficients, and the effects of treatment are carefully watched by the comparison of the coefficients week by week. It is certain that life in most cases of Bright's disease may be very greatly prolonged by exact regulation of the dietary and the systematic application of physiologic measures calculated to promote intestinal asepsis and activity of the skin.

The following is a typical daily program for a case of Bright's disease:

Patient, a man forty years of age, six feet in height, fairly strong and without cardiac complication.

6:30 a. m.—Dry friction in bed.
7:00.—Gentle chest exercises in the gymnasium.
7:30.—Breakfast.
8:15.—Rest for 45 min. in horizontal position, in room with windows open, or in the open air; well wrapped in cold weather.
9:30.—Exercise for half an hour in the open air.
10:00.—Electric-light bath for five minutes, followed by cold mitten friction and massage.
11:30.—Manual Swedish movements and breathing exercises for thirty min.
12:00.—Sleep for one hour in the open air or in room with windows open.
1:00 p. m.—Dinner.
2:00.—Rest for one hour in the open air without sleeping.
3:00.—Carriage ride 40 min., or walking in the open air for 30 min.
4:30.—Mechanical Swedish movements—abdominal kneading, vibration, mechanical massage.
5:00.—High frequency current, general application, to lower blood-pressure.
6:00.—Luncheon of fruit or yogurt.
6:45.—Rest half an hour.
7:45.—Lecture or entertainment.
9:15.—Application of moist girdle and retiring, sleeping in the open air under awning with windows wide open, or with window tent or fresh-air tube.



RESPIRATION APPARATUS FOR TESTING THE PATIENT'S METABOLISM

Pernicious Anemia

This grave malady, while not yielding constantly successful results, is by no means hopeless. By means of an antitoxic dietary, chronic autointoxication is successfully combated; and by the application of well-tried hydriatic measures, especially graduated cold procedures, with gentle applications of massage and the judicious employment of electricity, open-air treatment, and other appropriate physiologic measures, success is secured even in very unpromising cases. By the exercise of judicious care, the improvement secured may be maintained, as has been demonstrated by a number of cases which have been kept in good health for years after having been given up as quite hopeless.

The recently published researches of Herter and others leave no room for doubt that pernicious anemia is primarily due to bacterial infection of the intestine and absorption into the blood of poisons which dissolve the blood and which interfere with the progress of hematogenesis. Herter has clearly proved the relation of *bacillus aerogenes capsulatus* to this condition; hence the first and most important thing to be done in these cases is to combat the intestinal autointoxication. When the intestine has been largely cleared of the invading organisms, the blood may be rapidly built up and the patient restored to comfortable health.

Under the application of the physiologic method of dealing with these cases, which has been gradually developed within the last thirty years in harmony with this view, the blood-count may often be seen to double within a week or ten days' time, and a restoration of the blood-count to the normal sometimes takes place inside of three or four weeks. There is certainly no other method whereby so excellent results can be obtained. One of the greatest of all the advantages of this method of dealing with this class of patients is that when the patient is once restored, he may remain well if he will adhere closely to an antitoxic dietary and so prevent a new infection of the intestine. The great difficulty is that the great majority of these cases, returning to the ordinary diet, and especially by returning to the use of flesh foods, reinfect the intestine, re-establishing the anaerobic flora with which flesh foods always abound, and, by reintroducing the deadly *bacillus aerogenes capsulatus*, one of the chief agents of the putrefaction of meat, they soon suffer anew from the well-known symptoms of pernicious anemia. The antitoxic regimen must be followed continuously and permanently. On no other condition can the patient hope to escape a relapse. With this condition he may expect to retain the improvement made under treatment.

Not infrequently apparent recoveries have been secured in cases which appeared hopeless. Many cases might be cited in which this disease, generally regarded as incurable, has yielded most excellent results under treatment. It must be remembered, however, that every case of pernicious anemia is associated with a greatly depreciated organism, so that a prompt return of the symptoms may be expected unless the patient adheres closely to the regimen by which improvement was secured. A careful study of the metabolism of the patient is made in all cases of anemia. The behavior of the case under various dietetic prescriptions is carefully noted and graphic-

WHEEL CHAIR SOCIAL ON THE LAWN

ONE OF THE TENT COLONIES

ally recorded so that the reaction of the body to the various changes made may be readily noted and a dietary selected which is best adapted to the patient's condition.

Drug Habits

Morphia, cocaine, and alcohol habits are rarely, if ever, cured by antidotal or substitution methods. The system of dealing with these unfortunate cases which has been developed at the Battle Creek Sanitarium is based upon the successful treatment of many hundreds of individuals, and demonstrates the superiority of the physiologic method in drug addiction. Not only is the withdrawal of the drug not attended with extraordinary suffering, but the craving for the drug is speedily overcome, and when this system is employed in a thoroughgoing way, permanently removed. Incorrigible or objectionable cases are not received.

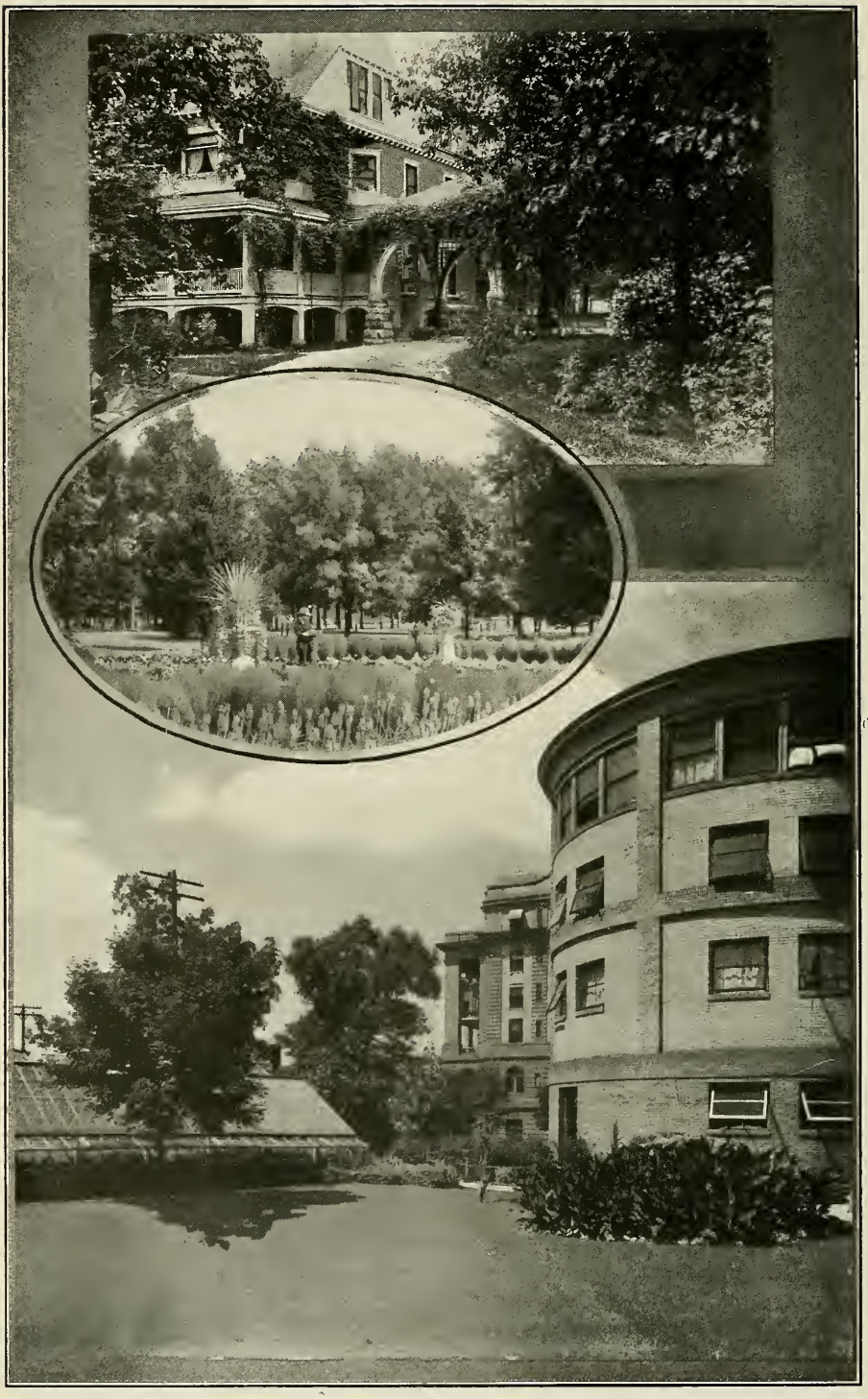
When a patient of this class is received into the institution, he is put in charge of two attendants—one for the day and the other for the night. He is constantly under supervision. After a few days of preparation by means of electrical baths and vigorous tonic treatment, the withdrawal of the drug is begun. In this the patient's cooperation is solicited. With a little encouragement he will willingly reduce the dose one-half each day for three days, and at the end of the third day will drop it altogether.

Very rarely is any considerable degree of inconvenience experienced during more than the first twenty-four hours. The attendant stays by the patient, doing something for him every moment. Gentle friction of the limbs, rubbing of the spine, hot applications to the spine, a neutral bath, head massage, a few spoonfuls of food, an ice-bag over the heart, cool rubbing, an electric bath, an air bath—unceasingly the nurse applies one thing after another as the various symptoms indicate, thus, not only palliating the patient's suffering, but diverting his mind and relieving the tedium of the passing hours. After a few hours the distressing symptoms grow rapidly less, and in twenty-four to forty-eight hours the patient, with very rare exceptions, finds himself delivered from the galling bondage which has held him fast.

Chlorosis

This disease, sometimes so obstinate to ordinary methods of treatment, usually yields promptly to physiologic measures. The electric-light bath, the sun bath, the actinic ray of the arc light, followed by short cold applications of some sort, such as the cold mitten friction, the towel rub, effervescent rub, the wet sheet rub, or the shallow bath, quickly change the whole complexion of the case. The spasm of contracted vessels is relaxed, bringing the glow of health not only to the patient's cheek, but to the whole cutaneous surface. A general quickening of all the vital functions rapidly replaces the enfeebled tissues by a sounder growth, builds up the blood, restores muscle and nerve tone, and within a few weeks brings the patient to complete recovery.

The out-of-door life, swimming baths, and gymnastics, together with massage and local general electric applications, are wonderfully helpful in these cases.



SCENES ABOUT THE SANITARIUM GROUNDS

The training of the skin by daily exposure in the out-door gymnasium in the summer months and the use of powerful arc lights in winter, is a most valuable aid in cases of this kind.

Perhaps the most important of all factors in these cases is the careful regulation of the antitoxic dietary and the establishment of a low protein ration. The foundation of this practice is the belief that the deterioration of the blood is only in small part, if at all, due to a deficiency of blood-making elements, but is due to the absorption into the blood from the alimentary canal of poisons by which the blood-cells are destroyed and hematopoietic processes interfered with. The adoption of an antitoxic diet and other means for combating intestinal autointoxication (see page 131) rarely fails to produce prompt and satisfactory results.

Recovery almost always begins as soon as the patient is placed under treatment. The improvement can be noted from day to day by the rise in the blood-count and hemoglobin. An increase of half a million in a week is very common in the blood-count.

Obesity

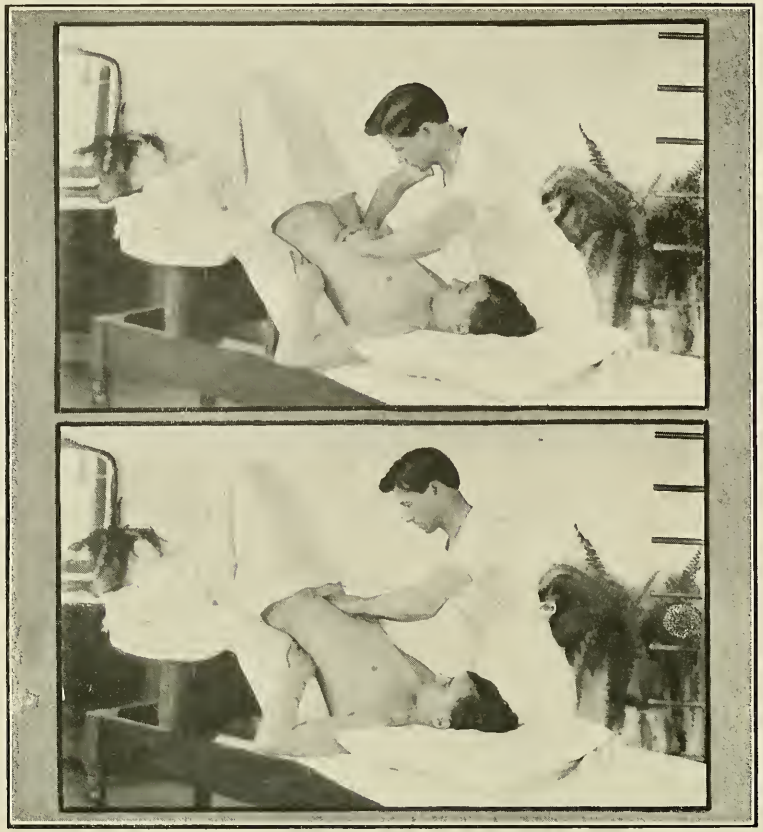
In every serious case of obesity a thorough study is made of the patient's metabolic processes by determination of the nitrogen balance and by obtaining the respiratory coefficient. Daily or tri-weekly examinations of the urine are made, the patient's food is carefully measured out to him in calories, and the influence of the various foods and treatments upon his metabolism is carefully noted and the results represented upon a metabolism graphic.

A cure may always be effected when the patient is able to carry out the regimen required. With very feeble patients, massage, manual Swedish movements, and applications of the sinusoidal electrical current may suffice to burn up the surplus fat. Obese patients always get well if willing to work hard and persevere. A pound-a-day loss is a good average rate which can be maintained for a long time and with permanent results. A too rapid loss is not wise.

When an obese person places himself under treatment a careful history of his case is taken and a thorough physical examination is made. He is then weighed, his height taken, his weight coefficient determined, and, by means of the dynamometer, the strength of each of his thirty groups of large muscles is determined and plotted on a chart; so it is possible to see at a glance his exact relation to the average person of his own height. His strength coefficient indicates the amount of muscular work which he should do daily. His strength-weight coefficient indicates the degree to which he is handicapped on account of his weight. His height-weight coefficient shows the excess of fat.

The blood-pressure is obtained, both systolic and diastolic, and a cardiac endurance test is applied—a very important determination in cases of this nature, in which a fatty heart may be easily damaged by overexercise or by excessive hot or cold applications.

Endurance and other physical tests are made, and the results are carefully considered.



COLON MASSAGE

LADIES' MANUAL SWEDISH DEPARTMENT

SCENE ON SANITARIUM GROUNDS

The individual patient then receives a carefully adapted prescription, which usually includes the following:

1. Reduction of the number of calories to a half or a third the amount required for an ordinary person of the same height. For example, suppose a woman's height to be 65 inches; her normal weight should be 120 lbs., but her actual weight is 240 lbs. The number of calories normally required by this woman to maintain her weight and strength is shown by the table to be 1,790 calories; that is, 180 calories of proteins, 402 calories of fats, and 1,208 calories of carbohydrates. The patient is asked to eat, say, 1,000 calories—about half the daily requirement. The amount of protein will not be reduced. The reduction will be made in fats and carbohydrates principally. That is, in this case the amount of proteins would remain 180 calories; the fats will be reduced to 300 calories, and the carbohydrates to 520 calories. Sometimes it is advantageous to eliminate the fats entirely for a short time, but patients generally do better if allowed a moderate amount of fat, as this serves to satisfy their craving for food, and the actual number of calories may be made less when some fat is supplied than when it is discarded altogether.

Occasionally a very fleshy patient, desiring to reduce flesh rapidly, will propose to fast for a few days. If the general strength is good, this may be permitted, but not otherwise. Sometimes the patient objects to the restriction of the food to so small a quantity. Such a patient is told that he may eat as much as he likes, provided he will eat only one article of food. He may select bread, fruit—almost any article he chooses—provided he will strictly refrain from eating any other kind of food. Breakfast, dinner, and supper the diet is the same—one dish only. The monotony of the diet cuts down the quantity to as low a limit as is desirable.

So long as the patient eats less than the actual amount of food required for the maintenance of a normal person of his height, he is bound to lose in flesh, and the greater the difference between the number of calories he eats and the normal, the more rapid his loss will be.

2. The patient is required to take two cool baths a day, their length gradually increasing as reactive power increases. It may be a wet sheet rub, a rubbing shallow bath, a spray, or a swim. The effect of this cold bath is to burn up a portion of the unnecessary residual tissue which has accumulated in the form of fat.

A prolonged swimming bath, or immersion in a full bath at a temperature of 78° to 80°, prolonged for thirty or forty minutes, with moderate exercise, will so increase heat production as to consume an ounce or more of fat.

3. Patients in whom there is no cardiac indication to the contrary, receive twice daily an electric-light bath or some other form of sweating bath, followed by a cold bath. The bath should be managed in such a way as to secure free perspiration for fifteen or twenty minutes. This also increases oxidation, and so results in the burning up of a large amount of fat.

4. If able to do so, the patient is required to walk an increasing distance each day. A patient weighing twice the normal amount will consume an ounce of fat in walking a mile and a half to two miles. This is

SANITARIUM FAMILY

NURSES, ATTENDANTS AND EMPLOYES

due to the increased activity of the combustion processes of the body as a result of exercise. Three to ten miles daily soon becomes a cheerful task.

5. Persons who are not able to take active exercise may be exercised vigorously by means of the sinusoidal current. When applied by means of special apparatus devised for the purpose, all the leading groups of muscles of the body may be made to contract simultaneously under the stimulus of the sinusoidal current. By weighting the muscles with sand bags after the method of Bergeron, the muscles may be made to do any amount of work desired. The work may be concentrated in the abdominal region or any other part where there is an excessive accumulation of flesh. The patient perspires freely after the treatment, but without suffering the fatiguing effects of voluntary exercise. The weight may be reduced by this means at the rate of a pound in an hour.

6. Diathermy renders very great service in these cases. By appropriate applications the oxidation of fat, both local and general, may be greatly stimulated. By this method massive doses of electricity may be converted into heat in the depths of the tissues and thus the oxidation processes may be stimulated to a very high degree. This method is especially useful in cases of accumulation of fat within the cavities of the abdomen and chest, which are more readily influenced by this measure than by any other.

7. In certain cases the over-accumulation of fat is now known to be due to disturbances of the functions of the pituitary body or of the thyroid gland. In these cases the appropriate measures are addressed to the active cause of the disease, whatever it may be, in conjunction with other measures which have been above outlined.

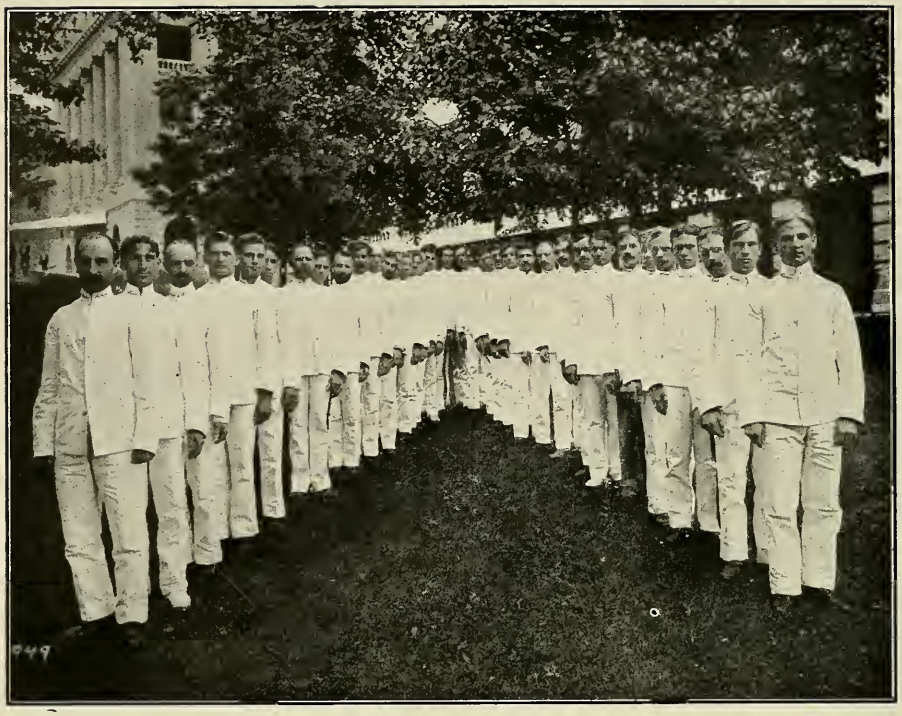
8. Manual Swedish movements are also an important factor in the treatment of these cases. Special days orders are provided for these patients, carefully graduated and so arranged that the effect may be concentrated upon any particular portion of the body, as may be indicated. Special attention is usually directed to the abdomen, externally or internally, or to the hips.

The effect of these special movements is enhanced by various local applications, such as the sinusoidal current to induce passive muscular exercise, and the heating compress to promote disintegration and absorption.

The heart is carefully watched so that it shall not be overtaxed, and the patient is required to report his weight and his dietary each day, while the dynamometer determines whether he is losing or gaining in strength.

The determination of the height-weight and strength-weight coefficients at frequent intervals shows with mathematical exactness the direction and rate of progress. An obese patient may experience a growth of muscle tissue with a gain in strength while losing fat, but without any change in weight. This will be shown by the improved strength-weight coefficient and the patient will be encouraged to persevere in his work. The reduction of fat is necessarily a somewhat tedious and strenuous process, and the patient needs all the encouragement his case and progress warrant.

A careful eye must also be kept upon the urinary coefficients, especially the coefficients of demineralization and tissue waste. By means of the respiration apparatus and a determination of the respiratory quotient, it is possible to control at will the process of tissue oxidation. Too rapid tearing down



GENTLEMAN NURSES

WOMEN NURSES

of the tissues, and especially an exaggerated nitrogen loss, is most undesirable, leading surely to disastrous results. Vigorous measures for fat reduction are safe only when checked and guarded by a careful scrutiny of the metabolic processes, such as is afforded by carefully worked out coefficients.

A constant loss of flesh with a steady gain in strength is a certain indication that the patient is getting on well, but a loss of flesh with a loss of strength may give rise to pernicious results, and demands at once a change of program to avoid disastrous results.

In certain cases of obesity the disorder is the result of deficient oxidation due to diminished activity of the thyroid or other glands of internal secretion. These cases require the use of the remedies indicated in addition to the other measures described.

The following is a typical day's program for a patient suffering from obesity:

6:30 a. m.—Water drinking (half pint), plunge or cold shower and swim.
7:00.—Walk 1 to 2 miles.
7:30.—Breakfast on half ration.
8:15.—Lying down for thirty minutes, then leg-raising or walking on all fours for fifteen minutes, or
9:00.—Swedish gymnastics in the gymnasium.
9:30.—Mechanical exercise, vibration and mechanical massage.
10:00.—Water drinking (half pint), electric-light sweating bath, electric thermophore pack, wet sheet pack, or Russian bath, for ten to thirty minutes, followed by cold shower or swim, water drinking (half pint).
11:00.—Rest thirty minutes.
11:30.—Manual Swedish movements—day's order for obesity.
12:00.—Walk in the open air, one to three miles. Water drinking (half pint).
1:00 p. m.—Dinner,—half ration.
2:00.—Rest half an hour.
2:30.—Mechanical movements.
3:00.—Walk one to two miles. Water drinking (half pint).
4:00.—Sweating bath ten minutes, followed by swim for 20 minutes. Water drinking (half pint).
5:00.—Electrical gymnastics, sinusoidal current.
6:00.—Supper, half ration, one pint of liquid food.
7:00.—Calisthenics in gymnasium.
8:00.—Walk one or two miles, or special exercises in room.
9:00.—Water drinking (half pint), apply heating compress.
9:30.—Retiring.

Rheumatoid Arthritis

Recent studies of this disease have given good grounds for the belief that it is simply one of the protean forms in which chronic intestinal autointoxication manifests itself. That chronic rheumatism and rheumatoid arthritis are not due to uric acid may be regarded as clearly established; but that they are due to poisons generated in the body is nevertheless true, and these poisons are so closely associated with uric acid that it is no wonder that the latter has been mistaken for the real mischief-maker. The writer is fully persuaded that the principal cause of chronic rheumatism is toxins produced in the colon by putrefactive organisms and various toxin-forming germs.

MUSEUM AND PATHOLOGICAL DEPARTMENT

In studying the fecal matters of patients suffering from rheumatism and rheumatoid arthritis, an extremely infected condition of the colon has been constantly found. Six, eight, and ten billion of bacteria per gram of dried feces are common observations. It is no wonder that metabolism should be seriously disturbed and that grave structural changes should take place when such an enormous flood of toxins is continually, year after year, poured into the blood from the colon, as must be the case with such a prodigious putrefactive flora flourishing in the alimentary canal.

The regulation of the dietary is a matter of the first importance in these cases. Indeed, flesh foods must be entirely discarded, not because they contain uric acid, but because the undigested residues of such foodstuffs remaining in the colon promote to a prodigious degree the development and increase of the virulence of the colon bacteria, and consequently the development of the pernicious toxins to which this disease is due. This has been clearly shown by Herter.

The patient must be placed upon a strictly antitoxic dietary. Buttermilk and yogurt may be freely used with advantage. The colon is washed out by large enemas daily, and, if necessary, twice daily for a time, until the bacterial count is reduced to somewhere near the normal point.

The general treatment consists of short electric light baths, followed by cool rubbings. The purpose of the light bath is to increase the activity of the skin and to improve metabolism. There is no virtue in prolonged sweating in these cases. Many cases have been greatly damaged by long sweating baths and other debilitating treatment at various mineral springs.

All sorts of thermic applications are made to the joints. Most effective are the fomentation, the photophore, and the electric thermophore. A much higher skin temperature can be secured with the photophore than with the hot-air apparatus. The latter is cumbersome and somewhat dangerous, and yet good results are obtained by it. All hot applications are useful.

After the hot application the heating compress is applied. This consists of a towel, wrung dry out of cold water, wrapped about the affected joint, including the limb for a little distance above and below. This is covered with mackintosh; then thick flannel wrappings are applied so as to secure quick heating and retention of the heat. The heating compress remains until the next thermic application. A hot application of some sort is made two or three times daily.

The development of the wasted muscles is secured by employment of the sinusoidal current, massage, and passive movements. Sun baths and the arc light, and in summer-time the sand bath and open air treatment are found of great value in these cases through their invigorating effect upon the skin. The effervescing bath (Nauheim), the effervescent rub, the salt glow, and dry friction enter into the program. Radium emanation or niton, employed by inhalation, emanation baths, or the so-called "drink cure" renders great service in relieving pain and other symptoms in some cases in which other measures have proven ineffective. The respiratory quotient determined by the respiratory apparatus of Benedict is also extremely useful for this purpose.

Diathermy affords a means by which heat may be applied to the internal

THE CHEMICAL LABORATORY

BUSINESS OFFICE

structures more effectively than by any other means. One-half an ampere to an ampere of current may be passed through a defective joint without effecting the slightest pain or other sensation than that of heat. By this means the temperature of the internal part may be raised four or five degrees, and the powerful stimulating effects of heat may be brought to bear upon parts remote from the surface and otherwise inaccessible.

Cases are very rare in which material benefit can not be obtained by application of the measures mentioned above and allied means. The treatment must sometimes be continued during several months to secure the maximum results, but since the recognition of the part played by the colon infection as a causative factor in this disease, the time required to secure large results has been reduced one-half, or even more.

Diabetes

The general plan followed in the treatment of diabetes is the excellent system worked out by Prof. Von Noorden and his pupils, Prof. Falta and others. Bearing in mind the fact that the source of most imminent danger to the diabetic patient is not the amount of sugar he discharges in his urine, but his inability to store glycogen in his liver and muscles, one of the first steps is the determination of the patient's condition in respect to glycogen storage by obtaining his respiratory quotient. This is done by means of the excellent apparatus developed by Benedict in the Carnegie Nutrition Laboratory at Boston. If a quotient of 70 or less is obtained after a liberal dose of carbohydrates, instead of the normal 80, this means no storage of glycogen and signifies a very grave case. A coefficient of 72 or 73 shows still a sufficient storage power to give a good chance for improvement.

The next step is to find out the maximum amount of carbohydrates that the patient can safely take and to increase his tolerance for carbohydrates through careful training by green diet and by the improvement of the patient's general vital condition. The very constant association of intestinal putrefaction with grave cases of diabetes to which attention has been called by Von Noorden and Falta is an indication for close attention to the intestinal flora and the use of special treatment to combat development of intestinal intoxication which is greatly favored by the restriction of carbohydrates and increase of fats and proteins which is necessary in this disease. The patient's bowels are made to move three times a day by means of massage, manual and mechanical Swedish movements, the use of a very laxative diet in which definite amounts of cellulose are given, and by other natural means.

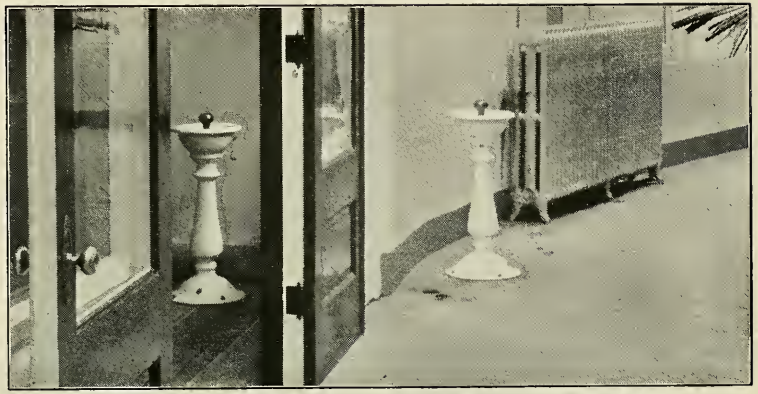
Special cultures of antitoxic ferments are freely given. A culture containing active growths of *Bacillus Bulgaricus, Bacillus bifidus* (Tissier), and *Bacillus Glycobacter* (Wollman, Distaso), has been found most effective in changing the intestinal flora and combating intestinal intoxication in diabetes as well as in other disorders associated with chronic toxemia.

A variety of gluten breads and many other preparations specially designed for diabetes are provided, including the greatest possible variety of green vegetables, such as artichokes, Japanese krosnes, Chinese cabbage, a great abundance of lettuce fresh from the Sanitarium greenhouses, dasheen bulbs and shoots, and all sorts of greens.

ONE OF THE FOYERS AT THE END OF THE CORRIDORS

THE PHARMACY

A PATIENT'S ROOM



BUBBLE FOUNTAINS AT ENTRANCE OF PALM GARDEN

Every diabetic patient is put under the care of a trained dietitian who under supervision of his physician regulates his diet and caters to his needs and tastes.

At the beginning with these cases the patient is put under close observation for two weeks, during which time daily quantitative examinations of the urine are made and the effects of various dietaries are carefully studied. It is expected within the two weeks to determine not only the proportion of fat and protein adapted to the individual's condition, but also the particular variety of starch which he can best utilize. Much light is thrown on these cases by a study of the respiratory coefficient, the best means of determining the patient's ability to store glycogen, upon which the prolongation of his life depends more perhaps than upon any other single factor. By means of this close scrutiny and the nice discrimination which this method permits, surprisingly good results may often be obtained even in the most unpromising cases.

By careful quantitative examination of the urine daily or every other day, and a daily record of the patient's diet measured in calories of protein, fats and carbohydrates, exact data may be gathered by means of which a complete knowledge of the metabolic processes may be obtained and the effects of changes in diet or treatment may be noted. The examination of the urine includes the following determinations: the quantity, total nitrogen, urea, ammonia, diacetic acid, acetone, sugar, indican, indol acetic acid and chlorids. Other determinations are made as necessary.

In estimating the amount of food sugar, starch is converted into dextrose by the addition of ten per cent of its weight, and the sugar derived from the protein oxidized in the body is estimated by multiplying the total nitrogen of the urine by the factor 3.65. If we subtract the urinary sugar from the food sugar, the remainder would indicate the amount of sugar assimilated. By dividing this remainder by the total food sugar, we may ascertain the percentage of the food sugar which has been utilized—the coefficient of sugar utilization.

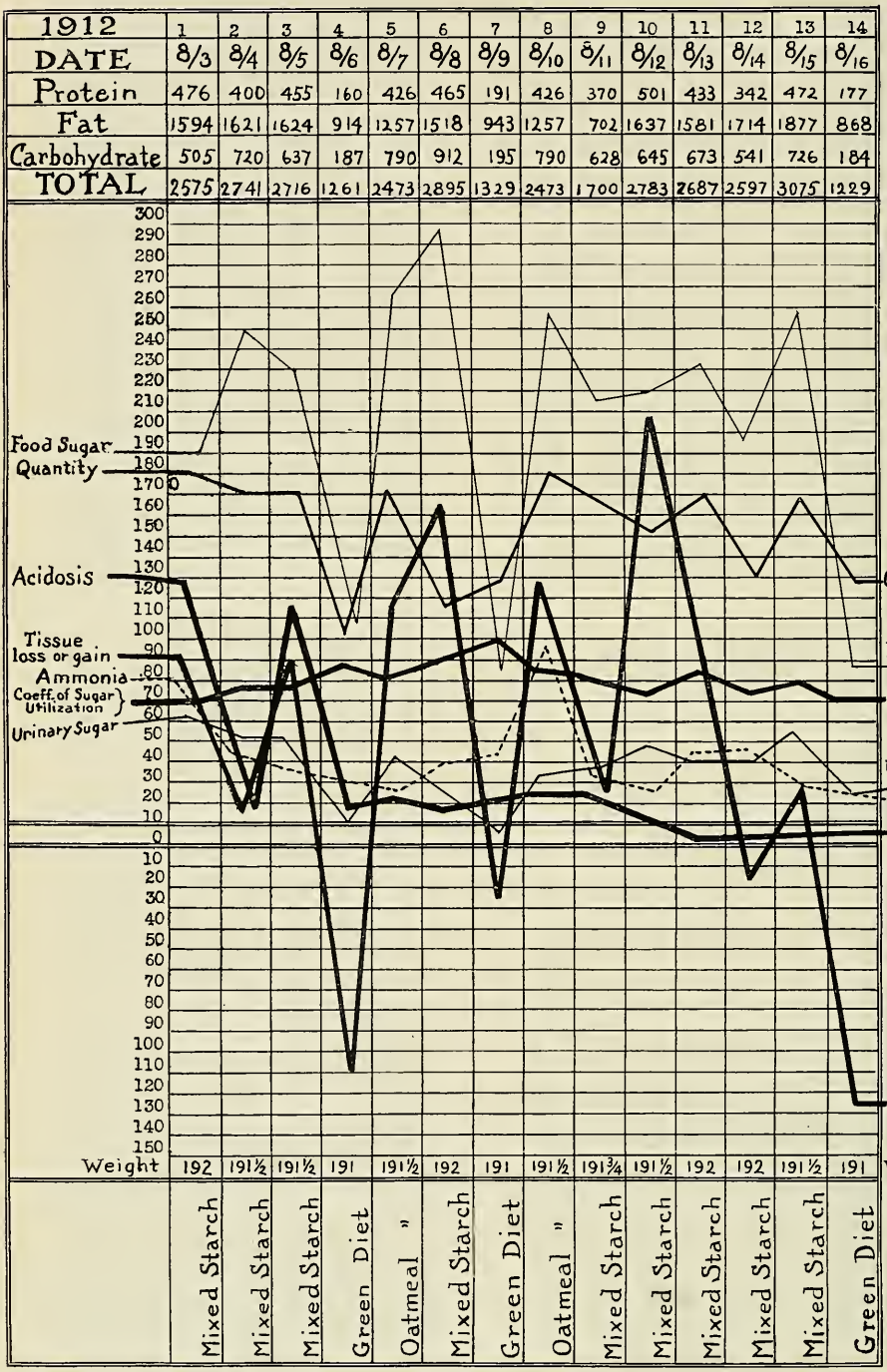
All the above data, together with the patient's weight, which is taken daily, is graphically represented as shown in the accompanying reproduction of a Metabolism Graphic. Determination of the nitrogen balance reveals loss or gain in the nitrogenous tissues. For example, if the nitrogen balance is minus 3, we know there has been body consumption with a loss of three ounces of nitrogenous tissue, since each gram of nitrogen represents thirty grams of tissue (Voit and Pettenkofer).

It has recently been shown by Benedict that in diabetes oxidation is increased rather than diminished. This fact renders highly important a close scrutiny of the protein and fat metabolism, as well as of the sugar utilization and a determination of the respiratory coefficient. The rise and fall of the acidosis curve is also watched with very great interest. By this means it is possible to recognize the approach of diabetic coma in severe cases in which the excessive oxidation of fat and protein leads to the production of beta-oxybutyric acid and its derivatives.

The importance of the frequent determination and most careful scrutiny of the coefficients relating to metabolic change in these cases can scarcely be overstated. Neglect to do this while making use of such powerful physi-

METABOLISM GRAPHIC

M. J. B. M. Dr. _____ Diagnosis Diabetes



ologic means as are needed to definitely influence general oxidation processes may easily lead to fatal mischief by favoring the development of acidosis and other grave complications. Physiologic measures are like steam hammers. They strike smashing blows, but must be accurately aimed, else irreparable mischief may be done.

The patient's weight and strength are watched, while measures calculated to improve oxidation are applied with gradually increasing vigor. These measures are essentially the same as those employed for obesity, but extreme care is exercised not to administer prolonged cold baths, especially in cases in which sugar is found in the perspiration. Prolonged hot baths are also avoided, as well as other depressing measures.

Emaciated patients, and all cases in which the urea coefficient is high, are restricted as regards exercise. The attending physician is constantly on the lookout for the slightest appearance of any symptom pointing toward diabetic coma.

The results obtained are often very gratifying. Chronic cases are rarely cured entirely, but the amount of sugar is greatly decreased, and, by proper regimen, is often held down to a low point. In mild cases the sugar usually disappears from the urine. The important thing is to teach the patient how to regulate his diet and his habits so as to enable him to live and enjoy life as long as possible with a crippled organism.

The Metabolism Graphic prepared by the dietitian shows the physician instantly any adverse trend of the case, and thus enables him to foresee and prevent the development of diabetic coma and other grave conditions.

Cardio-Vascular-Renal Disease—

There is no class of maladies in which the physiologic method, and especially the combined method of physiologic therapeutics which constitute the Battle Creek Sanitarium System shows its efficiency to better advantage than in the treatment of cardio-vascular-renal disorders.

The three classes of maladies, cardiac, vascular and renal, are considered together because of the frequency with which they are associated, especially in the advanced and secondary forms which are likely to come under the care of the Sanitarium physician.

In cases of organic disease of the heart with primary low blood-pressure, most brilliant results are often secured.

The hypotension and resulting passive congestion of kidneys, liver, stomach and bowels, and the results which follow this visceral stasis, are more amenable to physiologic measures than to any other. Carefully conducted tonic baths, particularly cold rubbings, as the cold mitten friction, cold towel rub, half-sheet rub, and later the rubbing shallow, the spray, and the douche, afford a graduated method by which the tone both of the heart and the vessels may be greatly improved.

The cold precordial compress, especially the cooling coil, affords a means of increasing the energy and efficiency of the heart far superior to any drug yet discovered. This method has been called the hydriatic digitalis, but it is far superior to digitalis in the fact that it increases the energy of the heart without increasing the resistance in the blood circuit. It has no cumulative effect and it does not lose its efficiency by continued

THE SUMMER KINDERGARTEN

YOUNG DEER IN A PRIVATE PARK NEAR BY

use. That this measure is capable of doing harm as well as good, especially in cases of cardiac dilatation, does not diminish its value, but only emphasizes the necessity for expertness and discrimination in its use.

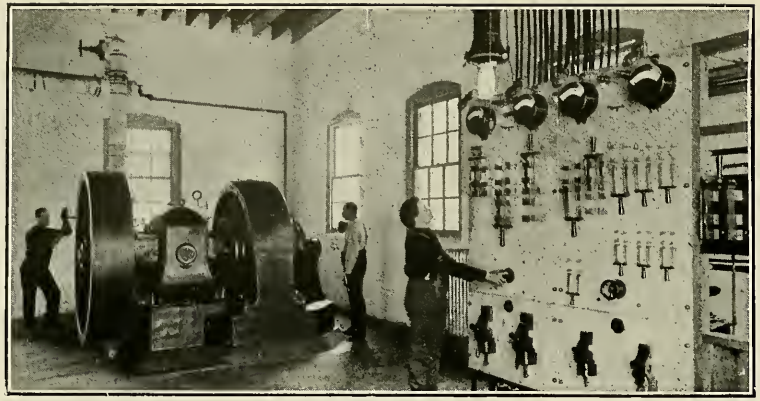
Visceral congestion is combated by the sitz-bath, wet girdle, the revulsive application to the spine, the salt glow, oil friction, massage and other measures whereby collateral hyperemia of the skin and superficial parts is established, thus relieving the deeper-lying structures.

A definite elevation of blood-pressure, 15 to 30 millimeters, is commonly noted within a week or two after the beginning of treatment in these cases. The albumin, which in advanced cases is often found present in the urine, usually disappears. Carefully administered tonic hydriatic applications improve the metabolism, appetite returns, tissue wastes are eliminated, there is increased vital resistance with improvement in the blood and secretions. The intestinal intoxication which in these cases is usually a prominent feature, rapidly diminishes, as shown by diminished output of indol in the feces and of the indican in the urine. By means of the colorimetric method the estimation of these products is made with accuracy, so that the diminution of the toxemia under a carefully arranged antitoxic regimen

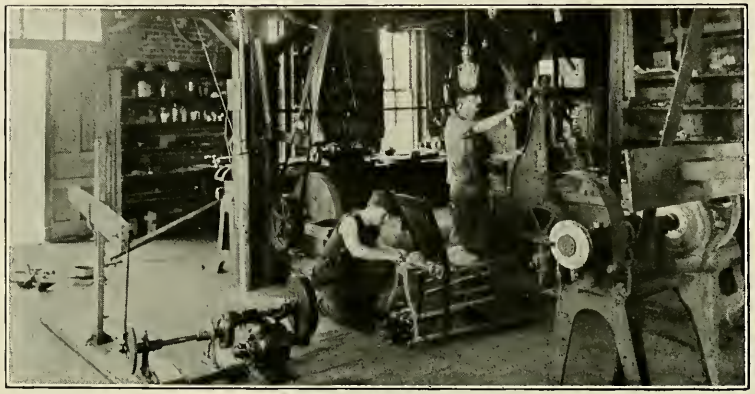
ASTHMATIC PATIENT BREATHING IN RAREFIED AIR

with special cultures of antitoxic ferments and tonic measures of treatment can be readily observed from day to day.

A point in prognosis to which attention is always given is the determination of the excretory efficiency of the kidney, both as regards mineral salts and urea. By the careful determination of a score or more of renal coefficients and a special test for renal efficiency and for water elimination,



ELECTRICAL DEPARTMENT



MACHINE SHOP

LAUNDRY

a very close estimate can be formed of the degree of damage which the secreting structures of the kidney have sustained. This is found a matter of much importance, not only from the standpoint of prognosis, but also from that of practical therapeutics. When the ability of the kidneys to eliminate chlorid is found to be diminished, the use of chlorid of sodium is restricted; and where dropsy is present, a saltless diet is administered; and it is often most gratifying to note the rapidity with which the dropsy disappears under this regimen in connection with suitable and carefully graduated diaphoretic measures, such as the electric-light bath, restricted to the legs, the half-blanket pack, and other partial diaphoretic measures associated with the precordial cooling coil, or a cooling chest compress.

In grave cases the observation of the blood-pressure before, after, and even during an application renders possible an exact adaptation of measures to the patient's needs. This precaution is required in not a few cases in which marked cardiac dilatation is present.

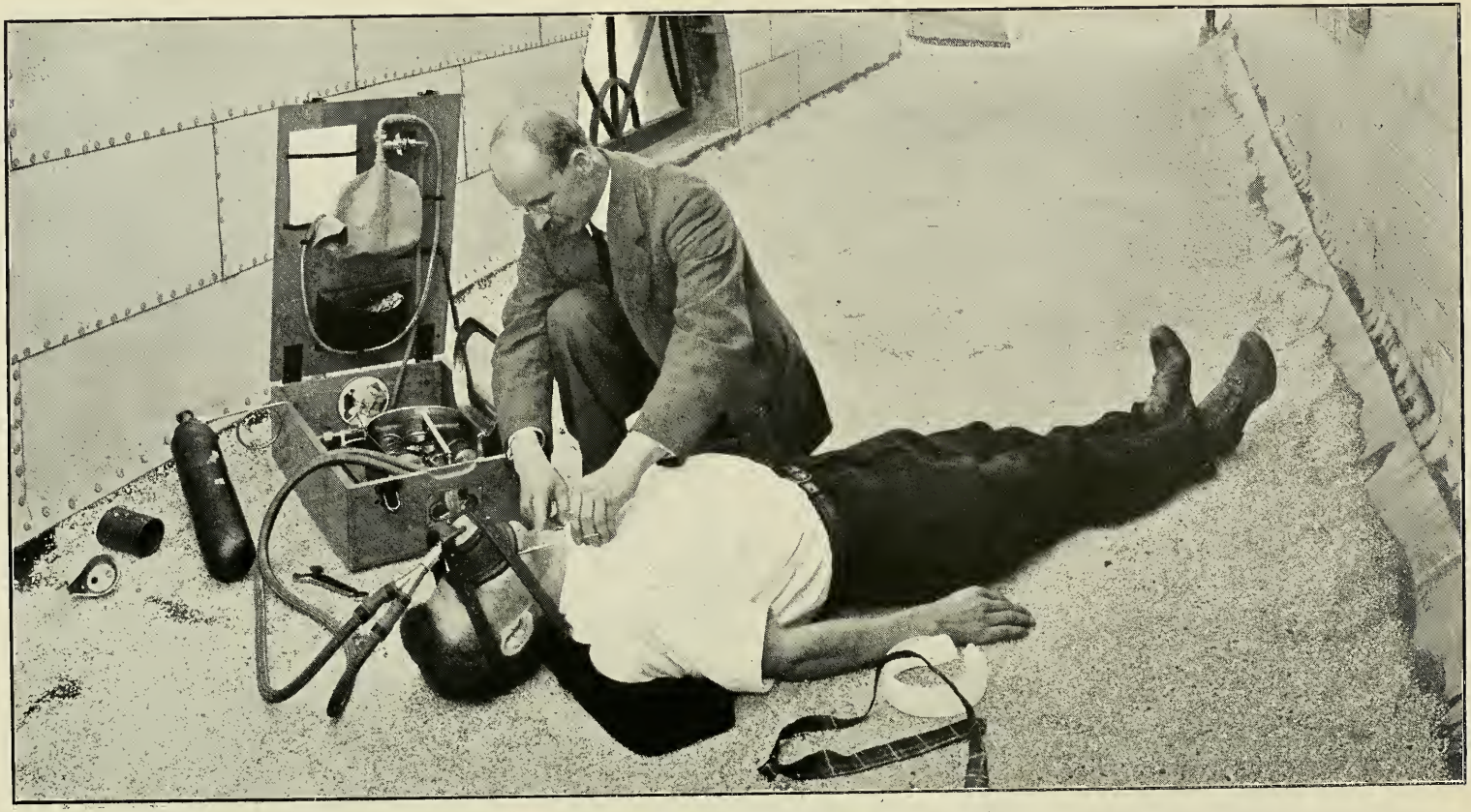
In certain cases of cardiac insufficiency, especially in cases of so-called cardiac asthma, the patient is greatly relieved by breathing into rarefied air. The degree of vacuum employed is a one-inch mercury column, or six to eight inches water column. By this means, which is found especially beneficial in cases of dilatation of the right ventricle of the heart, the suction power of the heart is improved, the movement of blood through the lungs is accelerated, the respiratory rhythm is regulated, and in favorable cases a very great amelioration of the patient's symptoms is at once recognizable. The arrangement of the special apparatus which has been constructed for this purpose is such as to permit the use of oxygen in any required proportion when it is found desirable.

Aerotherapy

Aerotherapy in various forms is employed in cases requiring this physiologic measure. Apparatus is provided by which patients may respire air under diminished or increased pressure, as may be desired. Oxygen or medicated vapors are used in combination with air when indicated.

The breathing of rarefied air is found especially beneficial in certain cases of cardiac insufficiency, especially in cases of cardiac asthma, and in certain cases in which the lung is crippled by adhesions, and whenever it is desirable to aid the pulmonary circulation or to regulate rhythm by decreasing the period of expiration and increasing the inspiratory period.

Special apparatus is provided for inhalation of oxygen in measured doses, and the pulmotor is used for automatic respiration when necessary. The pulmotor when connected with the respiratory organs by means of a suitable mask attached to the face, carries on automatically a most efficient artificial respiration, first forcing oxygen into the lungs, then withdrawing it, and repeating the process at a rate a little more rapid than that of ordinary respiration. This instrument is always at hand ready for instant use in case of an emergency, either in connection with artificial anesthesia or as the result of accidental asphyxiation from any cause.



THE PULMOTOR USED IN AN EMERGENCY CASE

Arteriosclerosis

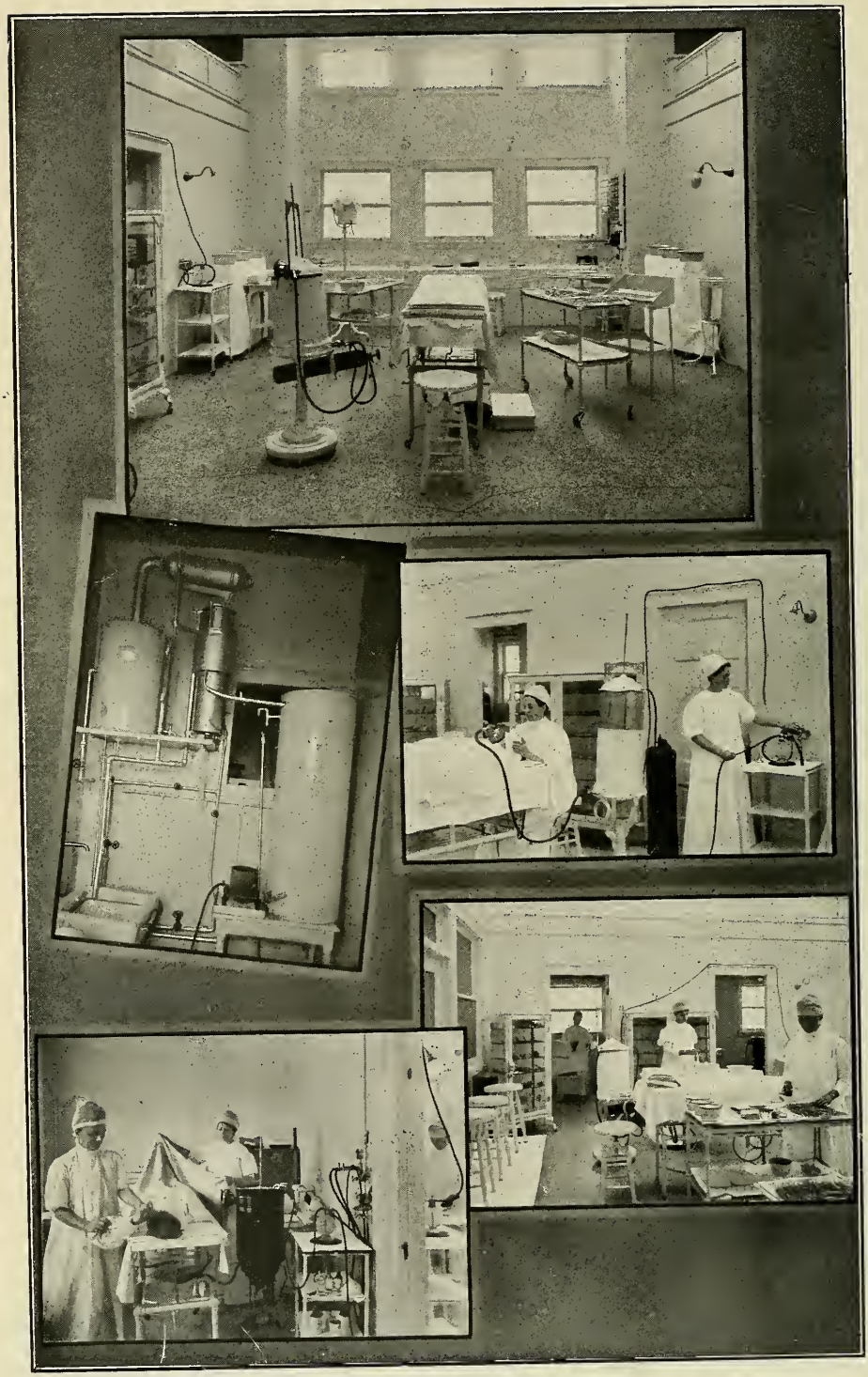
When symptoms of renal disease are present, especially in connection with evidence of cardiac failure, a searching inquiry is made to determine if possible whether or not the kidney lesion is primary or secondary. This naturally leads to a careful study of the condition of the vessels. Not infrequently, in cases of beginning secondary low pressure, the blood-pressure, though much above the normal, may rise 20 to 30 millimeters during the first weeks of treatment with a corresponding improvement in all the general symptoms. The high blood-pressure is of course necessary to the maintenance of the functions of the kidneys and other organs in which the blood-vessels are obstructed by degenerative changes. Later a gradual fall of pressure occurs. In cases in which extensive calcareous degeneration has not yet taken place, in fact, in the great majority of cases of hypertension, a very marked lowering of blood-pressure is secured.

The low protein and antitoxic regimen generally brings down the blood-pressure from 10 to 30 millimeters within a couple of weeks by lessening the amount of pressure-raising toxins in the body fluids. In cases of beginning secondary hypotension this beneficial effect is obscured by the improvement in the heart action which occurs at the same time as the result of tonic hydriatic applications and hydriatic heart tonics which are employed, the tendency of which is to increase blood-pressure. The diminution or disappearance of dropsy, the improvement in the urinary secretion, the improved renal coefficient, the disappearance of mental and nervous symptoms due to cerebral edema, the improved appearance of the skin and the general improvement in the patient's strength and feelings afford abundant evidence of arrest of morbid processes and improved conditions.

Later, as the general metabolism is improved under dietetic regulation and graduated physiologic applications of water, electricity, massage, special cardiac movements (Ling or Schott system), the effervescing bath and other appropriate measures, the blood-pressure gradually falls, sometimes to two-thirds or even one-half the maximum record.

These cases are always highly interesting, and results are rarely disappointing. While a few cases are encountered in which the patient has waited so long that nothing more can be done than to palliate his sufferings and prolong his life for a few months, the renal tissues having become so far degenerated that there is not enough secreting tissue left to do the necessary work required to free the blood from body-toxins, a large number of cases are met in which the improvement in the patient's condition is so rapid and so great as to seem almost miraculous.

It is certainly proper to say that there is no class of cases in which the advantages of the Sanitarium method are more apparent and the need of Sanitarium care and treatment more urgent than in this class of cases. It is proper, however, to emphasize the fact that there is no class of cases in which irreparable injury may be so easily and quickly done by the incompetent or improperly controlled application of hydriatic methods, either hot or cold, as in this class of disorders. For example, the cold cardiac compress is the most efficient means of stimulating the heart's action, but when suddenly applied in a case of lost compensation with extreme cardiac dilatation, the patient may be almost as certainly and as



THE SURGICAL OPERATING DEPARTMENT

suddenly killed as though shot through the heart with a bullet. In advanced cases of arteriosclerosis, either a very hot or a very cold bath may cause death by apoplexy. A hot bath may produce such great depression in a case of either primary or secondary hypotension as to cause death either at once or a few hours later. Nothing could be more dangerous than a haphazard or inexpert application of hot or cold baths, or even massage or movements in cases of this sort.

Marked beneficial effects are often observed from the application of the high tension current. The effects, however, of this measure are generally only temporary, consequently it has little curative value except when used in connection with measures which remove the causes of hypertension, especially elimination of the pressure-raising toxins from the circulation.

Diathermy and the use of radium emanation have in recent years been shown to be highly valuable measures in the treatment of arteriosclerosis.

This is especially true of diathermy. A current of 2-4 amperes applied to the spine and abdomen often lowers the blood-pressure twenty to forty points in fifteen minutes. Under daily applications the pressure steadily falls from day to day, sometimes returning nearly to normal. The effect is obtained by dilatation of the splanchnic vessels.

The Surgical Ward

While surgery is not a chief feature in the Sanitarium, specially favorable conditions are afforded to those requiring surgical attention. To the care of skilled surgeons is added the superior methods of nursing, which greatly lessen the inconveniences and the dangers in grave surgical cases. Up-to-date operating rooms, aseptic wards, and conscientious surgical nurses and assistants make this department successful in saving the lives of hundreds of cases annually; but the physicians take special pride in restoring their patients to health without surgery when possible, considering a cure by non-surgical means a far greater triumph than the most brilliant surgical procedure.

The Medical Staff

The medical corps of the Battle Creek Sanitarium comprises more than twenty physicians, and from 200 to 350 nurses and attendants, the number varying with the season of the year. The physicians are all men and women who have received a thorough modern medical training, are graduates of reputable colleges, and possessed of the legal requirements for the practice of medicine.

In addition to the ordinary medical equipment, these physicians have all received special training for five to twenty years or more in the principles and practical applications of the Battle Creek Sanitarium system of physiologic medicine. The physiologic method, like surgery, can not be learned from a book. It depends so largely upon exactness of technique in the employment of agencies which require physical means, instruments, and apparatus, a large training of hand and eye, and the development of the therapeutic judgment by actual experience, that only those who have

had special training can hope to obtain in its application the largest and best results.

It must be said, on the other hand, however, that there is no system of therapeutics which compares with the physiologic method in versatility of application and adaptation to emergency conditions of every sort. Every home affords the means necessary for the employment of the physiologic method, but of course in a restricted way.

The Sanitarium aims to make the largest and most efficient use of natural or physiologic methods possible, and the constant effort toward the accomplishment of this end has developed a broad and more or less complex system, presenting hundreds of measures, means, and methods, each of which has a technique of its own, and indications and contraindications the recognition of which is essential to success.

The leading physicians of the Battle Creek Sanitarium have been actively connected with the institution for ten to thirty years. All have been specially trained for their work in the best medical educational institutions of this country and Europe. None are allowed to take the responsibility of managing cases who have not had at least several years' experience with the Battle Creek Sanitarium system. But the largest experience would enable the physicians of the institution to accomplish little were it not for the aid which they receive from the laboratory experts in working out an accurate and complete diagnosis, and the cooperation of an army of trained nurses, dietitians, and attendants, who, with untiring, conscientious skill, carry out prescriptions at the bedside and in the various branches of the treatment department.

The management of the Battle Creek Sanitarium feels exceedingly grateful for the generous support and cooperation which has been accorded it by the members of the profession in all parts of the United States, as well as in foreign lands, where the most eminent medical bodies accord to the institution the same standing as that of any other well-organized public hospital. It will be the most earnest endeavor of the managers and faculty of the institution to make it in the future still more deserving of confidence and patronage, and to maintain its standing as a leading exponent of physiologic medicine.

Any reputable physician who desires to inspect the institution or to investigate its methods of treatment and clinical research, will be cordially received as a guest for a day or two at any time on application to the Medical Office or the Superintendent. A surgical clinic is held on Wednesday, and usually on one or two other days each week.

Letters from physicians introducing patients are often of great service and are always gratefully received. It is the policy and practice of this institution to cooperate with the home or attending physician, not to supersede or antagonize him. The mutual aim and interest is the recovery of the patient in the shortest possible time and to the most thorough extent possible. No method is employed which will not receive the endorsement of any scientific physician. The members of the medical staff are always ready to send to the attending physician not only a full report of the findings in the case, but also, when desired, an account of the measures of treatment employed.

OBSTETRICAL DEPARTMENT

The Obstetrical Ward

The advantage of physiologic treatment and training as a preparation for confinement is a matter which has received increasing recognition dur ing the last twenty-five years, and has led to so large a number of applications from expectant mothers that the management found it necessary to establish several years ago a special obstetrical or lying-in department. This department is in charge of a physician who has had exceptional training and experience in this speciality, in one of the largest lying-in charities in the country.

The after-treatment of these cases by the Battle Creek Sanitarium system is found to be greatly conducive to rapid recuperation and the prevention of the unpleasant sequelæ which sometimes follow confinement under less favorable conditions. The classes of cases which may be specially benefited by this department are: 1. Women who are muscularly weak through lack of original development or sedentary habits. Parturition is a muscular act, and a good muscular development is necessary to insure an easy childbirth and a rapid recovery. 2. Cases in which obstinate or uncontrollable vomiting threatens an unfortunate termination of gestation. 3. Cases of habitual miscarriage. 4. Cases in which from previous experience there is apprehension of puerperal eclampsia. 5. Cases in which there is reason to apprehend abnormalities of any sort threatening either the mother or the child.

The experience of this department has shown that the patient receives very great benefit from the special care and treatment, the regular regimen,

THE SCHOOL OF HEALTH IN SESSION

the careful supervision of the urine, the stools, the blood-pressure and the blood, and the carefully graduated training of the whole body in preparation for the final crisis. These benefits are shared by the child as well as by the mother.

Such arrangements are made as permit the patient to enjoy all the advantages of the Sanitarium without unpleasant publicity, and the department is supplied with every modern appliance and such conditions as secure the greatest safety to both mother and child.

The Kindergarten

Invalid mothers ought as a rule to be completely relieved of the care of young children during treatment, but there are exceptional cases in which the mother traveling from some far distant State does not feel content to leave the little one behind. To relieve such mothers of care and worry a kindergarten is maintained during the summer months in which children of all ages are entertained and instructed. This is not a mere nursery, but a scientifically conducted kindergarten in charge of a thoroughly trained and enthusiastic kindergartner. The work of the kindergarten is supplemented by that of competent nurse-maids, who relieve the mother of all cause of worry respecting her little ones. Infants and young children are not allowed in the main building except by special arrangement.

The Sanitarium and Hospital Training School for Nurses

The nurses employed in the institution are students or graduates of the Sanitarium and Hospital Training-school for Nurses, one of the oldest, largest, and most thoroughly equipped training-schools for nurses in the United States. The school has a faculty numbering thirty capable teachers and lecturers, and a curriculum which covers not only all the ground ordinarily covered in the best hospital training-schools, but in addition, the great field of hydrotherapy, electrotherapy, medical gymnastics, phototherapy, medical dietetics, and other features of the physiologic system.

The nurses have on an average two classes a day during their three years period in training. Training is carried forward during the entire year, so that the amount of actual instruction received by the students of this school is more than double that given in most other training-schools.

The Battle Creek School of Health and Home Economics

The necessity for training a large number of cooks, dietitians, and expert hygienic housekeepers for the work of the institution, to supply recruits for the constantly changing corps employed in these capacities, often numbering a hundred or more, led the management some years ago to establish a special department for this work, which has developed into an educational institution of unexpected proportions and importance. This department represents in its curriculum all the branches usually taught in the best schools of domestic or household science, and covers a still broader field, especially in the subjects of nutrition and medical dietetics, and in the application of the latest findings of science to the conduct of the home and the household.

CLASS IN THE COOKING SCHOOL

DIETITIANS

The special advantages offered by this school have already attracted a considerable number of students from distant parts of the United States and Europe, including graduates from other schools, chiefly persons preparing to fill positions as teachers of home economics in special schools and other institutions.

The General Atmosphere

A quiet, unobtrusive religious atmosphere is maintained in the institution. Morning worship is held daily. A Bible class for the study of the International Sunday-school lesson is held in the parlor Sunday afternoon, and a religious service is also held in the parlor Sunday evening. A Christian Endeavor Society meets every Friday evening.

No theological or sectarian propaganda is permitted. The status of the institution is solely that of a Christian altruistic enterprise.

Large numbers of nurses (2000), and many physicians (200), have obtained training here for the purpose of devoting their lives to various lines of missionary and altruistic work; seventy-five or a hundred others are constantly under training for this beneficent work.

A Public Charity—No Private Interest—No Sectarian Affiliation

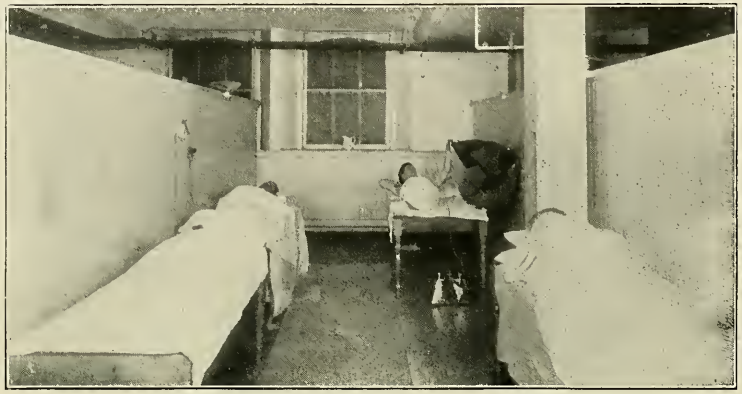
The Battle Creek Sanitarium corporation is a private enterprise conceived and conducted solely for the public welfare. It has never been owned by any church or sect. For many years the institution was closely affiliated with the Seventh-day Adventist denomination because of the fact that the original founders and contributing members were chiefly members of the denomination named; but the nonsectarian and undenominational character of the work was always fully acknowledged, and was fully indicated by its charter. An attempt made some years ago by the central committee of the denomination named to bring the institution under church control resulted in a complete severance of all relations to that body, so that since that time the institution has been absolutely free from any sectarian alliance whatever. The personnel is made up of Christian men and women of various denominations, but there is no church or sectarian control or affiliation.

There are no stockholders, no dividends, and no private interest; the property is dedicated to the public and is held by trustees for the purposes named in the articles of incorporation (see pages 25-27).

An Allied Charity

One of the numerous allied charities worthy of notice is the Haskell Home for Orphans, organized through the efforts of the Sanitarium Management, aided chiefly by the generosity of Mrs. Caroline E. Haskell, of Michigan City, Indiana. In this institution orphan children are reared, trained, and educated in accordance with the simple life principles of the institution. More than five hundred children have been rescued through the agency of the home.

This institution receives constant financial aid and other essential assistance from the Sanitarium Management.



DISPENSARY WHERE THE POOR ARE TREATED FREE

Sanitarium Health Foods

In the effort to meet the dietetic needs of a great variety of patients, the superintendent of the institution from time to time has devised various foods and food preparations, some of which have found general popular favor. Among these are cereal coffee substitutes, various dextrinized and malted or predigested foods, and various toasted flaked cereals. A number of these have been widely exploited by various imitators and piratical schemers. The numerous varieties of wheat and corn flakes on the market under various picturesque names are all imitations of the original wheat and corn flakes made for the patients of this institution.

The Battle Creek Sanitarium has never at any time had any connection whatever with the manufacture of any of the numerous nostrums made or sold by parties advertising from Battle Creek. The prestige of Battle Creek as a health center has made this an attractive place for the operations of various charlatans, and not the least pretentious and predatory of these are the numerous food charlatans who, posing as experts and discoverers, have reaped a rich harvest from the credulity of a confiding public and to some extent at the expense of the Battle Creek Sanitarium, because the profession and the public are generally unacquainted with the facts above stated.

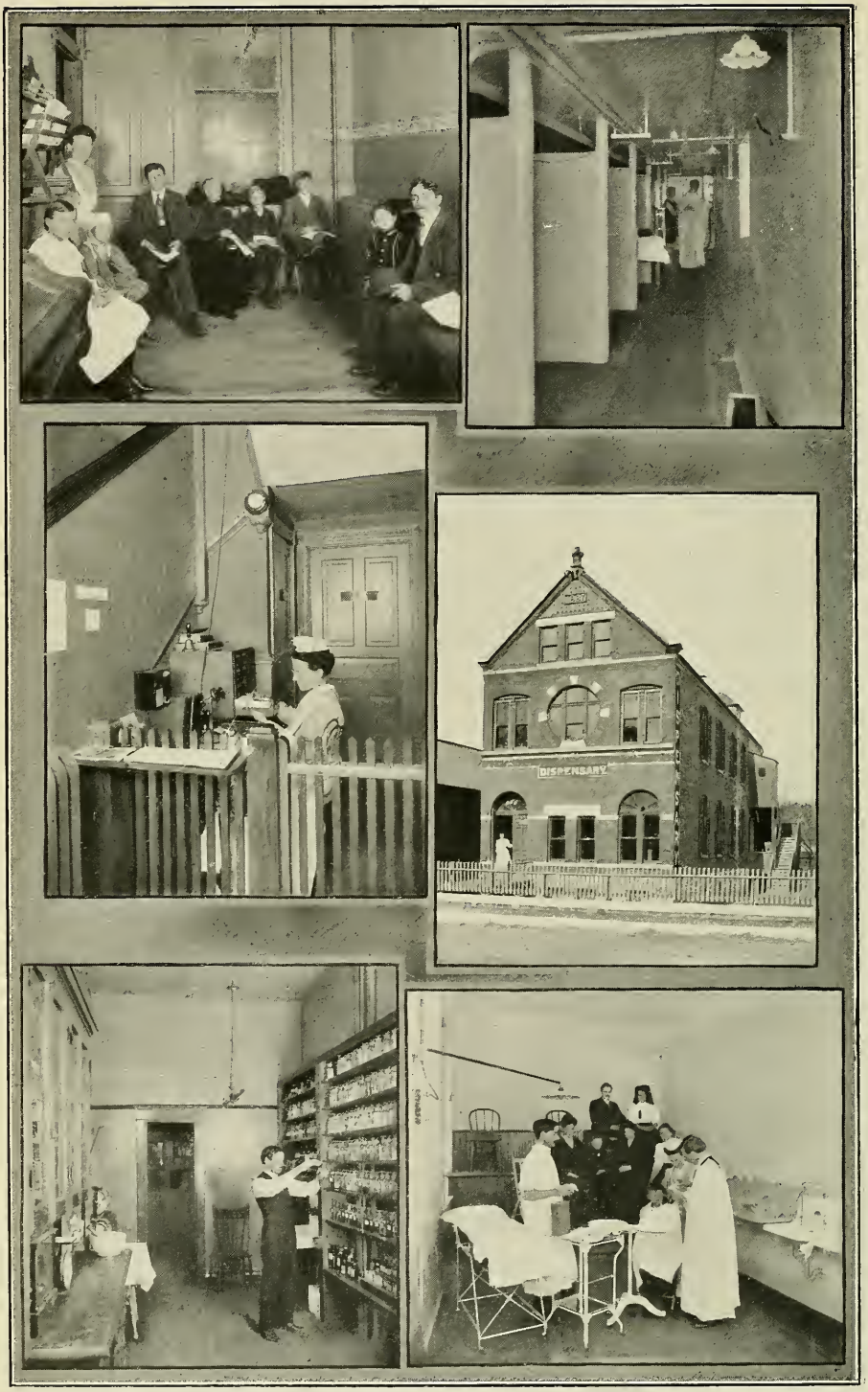
Department for the Treatment of Persons with Limited Means

Provision is made for the care of the sick poor as well as for the well to do. East Hall, one of the large buildings not destroyed by the fire, formerly used as a nurses' dormitory, was immediately supplied with a complete equipment of Sanitarium appliances. In this building persons who are not able to pay the prices named in the regular rate card receive special rates according as their circumstances may require. The minimum rates in this building are about half the regular rates. Arrangements must be made in advance for special reduced rates, as the accommodations for this class are necessarily not unlimited. The winter season, when the patronage is not so large as in the summer, is the best time to send patients of this class. Worthy persons of limited means receive just the same consideration as wealthy patrons as regards thoroughness of examination and treatment.

Further provision is made for persons whose means are still more limited. Across the road from the main building is located the Sanitarium dispensary. Here are found not only commodious examining offices, but also two complete suites of treatment rooms—for men and for women. Here the poorest patient may receive whatever treatment his case may require, without paying anything either for treatment, medical attention, or examination. The case of the poorest sufferer receives the same painstaking, careful investigation as that of the wealthiest patient.

A nominal charge of fifty cents daily is made for treatment in this department, but this is not required of those who are penniless. No applicant is turned away because of his inability to pay.

This class of patients are expected to provide their own room and board. Table board prepared by Sanitarium cooks may be had at the rate of fifty to seventy-five cents a day at the cafe.



DISPENSARY AT 888 THIRTY-FIFTH PLACE, CHICAGO

Several hundred patients are now treated annually in these departments, and as the debt incurred in the erection of the new building is gradually lessened, the number will be proportionally increased.

In addition to the charitable work above mentioned, a large dispensary has been maintained in Chicago since 1893. This is located in "The Jungle," or stockyard district, at 888 Thirty-fifth Place. The Battle Creek Sanitarium supports a number of visiting nurses in connection with the Chicago dispensary, as a part of the work of the training school for nurses, but the main expenses of this institution are met by personal donations from the members of the management. One or more visiting nurses are constantly employed in caring for the sick poor of Battle Creek and vicinity.

No Branches and No Affiliated Institutions

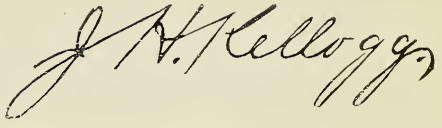
The Battle Creek Sanitarium has no branches and is not allied to or affiliated with any other institution in the world. It stands alone in its work as a separate, distinct organization, having its own mission, its own board of management, and supported by its own resources.

The Battle Creek Sanitarium is the only institution which represents in a thorough and up-to-date manner the Battle Creek Sanitarium System of treatment; in fact, it is the only one which is authorized to announce itself to the public as employing the Battle Creek Sanitarium System, as it is the only institution which is fitted up with the necessary laboratory appliances and the trained corps of physicians, attendants and nurses which a right application of this system requires.

Conclusion

In concluding this attempt to present on paper something of an idea of the methods of dealing with sick people which constitute the Battle Creek Sanitarium System of Physiological Therapeutics, the writer desires to express the hope that he has at least made clear to the mind of the reader that an earnest effort is made in the work of this institution to represent the art and science of rational medicine in a worthy and thoroughgoing manner, and to maintain the highest ethical and professional ideals.

As a last word, the writer desires especially to acknowledge his indebtedness to the members of the profession of the United States for numberless personal courtesies, and especially for the increasing measure of confidence and cooperation shown toward the institution as it has progressed and developed since the reorganization when the present management took charge thirty-seven years ago (1876), to the present more adequate and comprehensive state.



VIEWS ON ONE OF THE SANITARIUM FARMS

APPENDIX

Table Showing for Boys and Girls of Different Ages the Normal Height, Weight, Surface, and the Number of Food Units or Calories Required Daily

BOYS

Age	Height in Inches	Weight in Pounds	Surface in Square Feet	Calories or Food Units
5	41.57	41.09	7.9	816.2
6	43.75	45.17	8.3	855.9
7	45.74	49.07	8.8	912.4
8	47.76	53.92	9.4	981.1
9	49.69	59.23	9.9	1,043.7
10	51.58	65.30	10.5	1,117.5
11	53.33	70.18	11.0	1,178.2
12	55.11	76.92	11.6	1,254.8
13	57.21	84.85	12.4	1,352.6
14	59.88	94.91	13.4	1,471.3

GIRLS

Age	Height in Inches	Weight in Pounds	Surface in Square Feet	Calories or Food Units
5	41.29	39.66	7.7	784.5
6	43.35	43.28	8.1	831.9
7	45.52	47.46	8.5	881.7
8	47.58	52.04	9.2	957.1
9	49.37	57.07	9.7	1,018.5
10	51.34	62.35	10.2	1,081.0
11	53.42	68.84	10.7	1,148.5
12	55.88	78.31	11.8	1,276.8

Table Showing Height, Weight, Surface, and Number of Food Units or Calories Required Daily by Adults

MEN

Height in In.	Weight in Pounds	Surface in Square Ft.	Calories or Food Units			
			Proteins	Fats	Carbohydrates	Total
61	131	15.92	197	591	1,182	1,970
62	133	16.06	200	600	1,200	2,000
63	136	16.27	204	612	1,224	2,040
64	140	16.55	210	630	1,260	2,100
65	143	16.76	215	645	1,290	2,150
66	147	17.06	221	663	1,326	2,210
67	152	17.40	228	684	1,368	2,280
68	157	17.76	236	708	1,416	2,360
69	162	18.12	243	729	1,458	2,430
70	167	18.48	251	753	1,506	2,510
71	173	18.91	260	780	1,560	2,600
72	179	19.34	269	807	1,614	2,690
73	185	19.89	278	834	1,668	2,780
74	192	20.33	288	864	1,728	2,880
75	200	20.88	300	900	1,800	3,000

WOMEN

Height in In.	Weight in Pounds	Surface in Square Ft.	Calories or Food Units			
			Proteins	Fats	Carbohydrates	Total
59	119	14.82	179	537	1,074	1,790
60	122	15.03	183	549	1,098	1,830
61	124	15.29	186	558	1,116	1,860
62	127	15.50	191	573	1,146	1,910
63	131	15.92	197	591	1,182	1,970
64	134	16.13	201	603	1,206	2,010
65	139	16.48	209	627	1,254	2,090
66	143	16.76	215	645	1,290	2,150
67	147	17.06	221	663	1,326	2,210
68	151	17.34	227	681	1,362	2,270
69	155	17.64	232	696	1,392	2,320
70	159	17.92	239	717	1,434	2,390

DIET TABLE

Diet List, Showing the Nutritive Value per Ounce of Various Foodstuffs Expressed in Calories, the Weight Required for a "Portion" of 100 Calories Each, and the Number of Calories of Each Food Principle in an Ordinary Serving of Food.

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
¼	Almonds	24.5	146.4	20.2	191.1	.52	7	38	5	½
⅞	Almond Butter	26	152.8	21.4	200.2	.5	23	133	19	1¾
1¾	Almond Cream	1.1	65.5	9	85.8	1.16	19	115	16	1½
1½	Almond Meal	26	152.8	21.4	200.2	.5	39	229.2	31.6	3
5½	Apples	2.75	7.15	91.3	101.2	5.5	2	7	91	1
6	Apples, Almond	1.01	5.2	32.1	38.2	2.6	6	30	189	2¼
3¼	Apples, Baked	.6	1.3	28.4	30.3	3.3	2	3	94	1
4	Apples, Baked with Meltose Dressing	.7	1	35.7	37.5	2.66	3	4	143	1½
6 ⅛	Apples, Baked with Rolled Oats	1.6	1.6	37.7	40.9	2.4	10	10	230	2½
3¼	Apples, Baked Sweet	.6	1.3	28.4	30.3	3.25	2	4	94	1
2¼	Apple Butter	.34	.88	18.36	19.59	5.1	1	3	46	½
2½	Apple and Date Fluff	3.	7.1	88.6	98.8	1	7	18	225	2½
5½	Apples, Fresh	2.75	7.15	91.3	101.2	.98	2	1	91	1
1½	Apple Fritters	8.65	44.2	43.52	96.3	1.03	13	69	68	1½
2½	Apples, Grape	.5	1.3	45.99	47.79	2.1	1	4	120	1¼
3	Apple and Jelly	1.63	.98	38.36	40.97	2.45	5	3	117	1¼
6	Apple Juice	.0	0	17	17	5.8	0	0	100	1
2¾	Apple, Lemon	.5	1.3	34.9	35.9	2.8	1	4	95	1
3½	Apple Sauce	.3	.8	20.65	21.78	4.6	1	3	71	¾
5½	Apples, Sour	.18	.18	8.7	9.6	11.1	1	1	48	½
2¾	Apple Tapioca	2.6	.66	36	39.3	2.7	1	2	97	1
3¼	Apple Tart	4.76	11.19	41.7	57.6	1.7	14	33	128	1¾
4¼	Apple, Whip or Snow	5.5	1	13.9	22.4	4.4	25	5	70	1
3	Apricots	1.3	0	15.6	16.9	6	4	0	46	½
4⅝	Apricot a la Conda	2.83	12.38	19.95	35.16	2.77	15	60	100	1¾
3	Apricot Fluff	1.6	.33	14.6	16.5	6.6	5	1	44	½
3½	Apricot Sauce	1 2	0	20.5	21.7	4.6	4	0	71	¾
6	Apricot Shortcake	3.3	26.8	24	54.1	1.8	20	161	144	3¼
1¾	Asparagus (Cooked)	2.5	8.8	2.6	13.9	7.1	5	15	5	¼
3	Asparagus in Cream	2.8	17	4.9	24.7	4	9	51	15	¾
3	Asparagus Loaf	4.3	26.3	7.6	38.3	3.42	14	86	25	1¼
2½	Asparagus on Rice Biscuit	3.5	8.7	20.9	3.3	1.333	7	19	49	¾
4	Asparagus on Toast	5.5	26.9	18.5	50.9	1.9	21	105	74	2

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
3	Banana Cream	1.48	10.82	33.72	46.02	2.17	5	35	110	1½
4	Banana Dessert	2.1	7.4	23.4	32.9	3	8	27	90	1¼
2 ⅓	Banana Fritters	6	27.3	40.6	73.93	1.14	14	65	96	1¾
3½	Banana Mold	.64	.68	28.4	29.76	3.3	2	2	96	1
1¼	Banana with Mayonnaise	3.4	18.3	26.4	48.1	2.6	3	19	28	½
3	Banana Snow	1.8	.4	25.4	27.6	3	4	1	70	¾
3½	Bananas	1.5	1.6	25.7	28.8	3.47	5	6	89	1
2½	Bananas, Baked	3.2	4.73	32.37	40.3	2.5	8	11	81	1
5	Barley, with Dates	1.37	1.99	28.74	32.1	3.11	5	7	138	1½
6	Barley Gruel	1.5	.7	10.2	12.4	8.1	9	4	62	¾
3½	Barley, Pearl	2.97	.87	27.24	31.08	3.2	9	3	88	1
4¾	Bean Broth	4.3	3.2	11.6	19.1	5.2	22	16	62	1
4¾	Bean Broth (very thin)	2.8	0	.5	3.3	30.2	14	0	2	⅙
3	Bean Croquettes	8.74	11.78	33.2	53.72	1.86	20	30	100	1½
3¼	Beans, Baked	10.	12.5	33.5	56	1.7	32	38	105	1¾
3¼	Beans, Baked (canned)	8	6.6	22.9	37.5	2.6	27	22	76	1¼
4	Bean, Butter	5.48	.8	17	23.28	4.2	18	3	54	¾
3½	Beans, Baked Lima	5	11	15	31	3.22	17	35	48	1
2¼	Beans, Dried Lima	9.49	1.8	34.6	45.9	2.16	20	4	76	1
2¼	Beans, Green Lima	4.7	.8	17	22.5	4.4	10	2	38	½
3	Beans, Hulless	8.3	.7	23.7	32.7	3	26	2	72	1
3¼	Beans, Kidney	8.2	.5	21.6	30.3	3.3	27	1	72	1
2 ⅔	Beans, Marbled Roast	9.7	2.4	26.5	38.6	2.6	25	6	69	1
2½	Beans, Navy (cooked)	8.9	1.47	21.38	30.96	3.2	20	3	52	¾
3¼	Beans, String, with Butter	8.2	.5	21.6	30.3	3.3	27	1	72	1
3	Beans, String, with Cream	2.34	20.35	3.15	25.84	3.48	7	60	8	¾
4	Beans, Wax	1.2	.3	3.6	5.1	19.6	6	2	17	¼
2¼	Bechamel Sauce	3.02	22.4	7.8	33.2	3	7	51	17	¾
2¼	Beets	2.7	.3	8.6	11.6	8.6	5	1	19	¼
3	Beet Greens	2.6	9.1	3.7	15.4	6.5	8	30	12	½
4 ⅔	Beets in Aspic with Mayonnaise	3.1	10.5	3.2	16.8	5.9	14	46	15	¾
2	Beets, Buttered	2.61	13.61	8.9	24.3	4	5	28	17	½
2¼	Beets, Chopped	2.7	.3	8.6	11.6	8.6	5	1	19	¼
2¼	Beets, Sliced	2.7	3.	8.6	11.6	8.6	5	1	19	¼
3	Beets, Italian	1.83	17.6	12.45	31.8	3.4	6	55	39	1
1¼	Biscuit, Beaten	8.4	47.3	79.2	134.9	.75	10	61	104	1¾
2	Biscuit, Bran-graham	1.5	21.4	17.5	44.6	2.3	15	46	39	1
2 ⅓	Biscuit, Cream	10.3	27.5	49.6	87.5	1.1	24	64	112	2
1	Biscuit, Gluten	48.5	2.8	56.1	107.4	.93	45	3	52	1
½	Biscuit, Good Health (2)	5.8	2.7	58.5	67	1	4	2	44	½
¾	Biscuit, Granose	14.1	1.9	83.6	99.6	1	10	1	64	¾
1	Biscuit, Potato Gluten	96.8	16	22.1	135	1	72	12	16	1
1	Biscuit, Rice	8.5	.9	96.6	106	.94	7	1	92	1
1	Biscuit, Shredded Wheat	12	3	85	100	1	12	3	85	1
¾	Biscuit, Taro Gluten	47.8	32	68.8	148	1	24	16	35	¾
3	Blackberries	1.5	2.6	12.7	16.8	6	4	8	38	½
5¾	Blackberry Juice	0	0	30.3	30.3	3.3	0	0	174.2	1¾
3	Blackberry Sauce	.8	3.3	29.1	33.3	3	2	10	88	1
3½	Blanc Mange, Chocolate	3.4	22.86	16.25	42.52	2.35	12	81	57	1½
3	Blanc Mange, Cocoanut	3.8	36.4	17.3	57.5	1.74	11	111	53	1¾
2½	Blanc Mange, Farina	4.16	21.56	18.6	44.4	2.26	13	73	64	1½
5	Blood Oranges	.9	.5	13.5	14.9	6.7	4	2	69	¾
2¼	Blueberries	.7	1.6	19.4	21.7	4.6	1	4	45	½
5¼	Blueberry Juice	0	0	18.9	18.9	5.3	0	0	99.2	1
4½	Blueberry Sauce	.7	1.6	14.9	17.2	5.8	3	7	65	¾
4¾	Bouillon, Tomato	3.62	7.98	4.77	16.37	6.1	17	36	22	¾
4¾	Bouillon, Vegetable	7	4.3	7	18.3	5.5	29	18	28	¾
½	Brazil Nuts	19.8	178.1	8.2	206.1	.48	9	87	4	1

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
3	Bread, Boston Brown	6.5	2.4	51.2	60.3	1.6	19	7	149	1¾
3	Bread Custard Pudding	8.75	46.08	67.24	122.07	.81	23	133	194	3½
2	Bread, Corn	8.5	12.3	52	72.8	1.3	17	25	108	1½
2	Bread, Fruit	10.4	4.7	63.4	78.5	1.27	20	8	122	1½
2	Bread, Gluten	10.8	3.7	58.1	72.6	1.4	18	17	115	1½
2	Bread, Graham	10.4	4.8	60.8	76	1.3	20	9	121	1½
2	Bread, Rye	10.5	1.6	62.1	74.2	1.3	21	3	126	1½
2	Bread, White	9.3	3.7	63.4	76.4	1.3	18	7	125	1½
2	Bread, Whole Wheat	11.3	2.4	58	71.7	1.4	24	4	122	1½
1	Breakfast Pickup	7.91	6.38	16.23	30.5	3.27	25	23	52	1
3-5	Bromose, Nut	23	60.1	50	134	.8	13	34	28	¾
3-5	Bromose, Fig	15.7	53.3	64.8	134	.8	9	30	36	¾
4¾	Broth, Bean	4.39	3.16	11.58	19.13	5.2	22	16	62	1
4¾	Broth (Mock Chicken)	3.7	3.3	4.7	11.7	8.5	16	14	20	½
4¾	Broth, Protose	3.2	.9	2.9	7	14.2	11	3	11	¼
4¾	Broth (Vegetable)	2.8	0	.5	3.3	30.3	13.3	0	2.4	⅛
3½	Brown Betty	2.1	9.4	47	58.5	1.7	7	31	162	2
2¼	Brown Gravy	1.5	30.7	3.9	36.1	2.76	3	64	8	¾
2¼	Browned Cream Gravy	7.4	32.65	13	53	1.88	18	76	31	1¼
1¼	Buns	7.3	17.3	66.8	91.4	1.1	10	24	91	1¼
1¼	Buns, Cinnamon	10.9	19.2	69.2	100	1	13	23	89	1¼
1¼	Buns, Fruit	7.9	20.2	68.2	96.3	1.03	10	26	89	1¼
1⅓	Buns (Nut)	13.3	16.3	60.4	90	1.1	18	22	85	1¼
½	Butter (Dairy)	2	198	0	200	.2	1	99	0	1
6	Buttermilk	3.5	1.3	5.6	10.4	9.6	25	10	40	¾
3	Cabbage, Baked	4.2	10.26	4.1	18.56	5.3	12	26	12	½
3½	Cabbage, Baked in Tomato	1.18	2.38	3.39	6.95	14.4	4	9	12	¼
4	Cabbage, Boiled	.8	6.1	1.9	5.7	4.3	3	14	8	¼
3¾	Cabbage, Creamed	1.5	8.1	3.7	13.3	7.5	5	31	14	½
3	Cabbage, Escalloped	2.75	15.5	9.3	27.3	3	8	42	25	¾
4	Cabbage, Steamed	.8	3	1.9	5.7	17.5	3	14	8	¼
2	Cake, Coffee	7.6	40.9	66.8	114.6	.87	15	80	130	2¼
2	Cake, Rice Griddle	21	28.5	88.6	138.13	.72	42	57	176	2¾
1	Candy (Malt Honey Caramels)	5.6	0	94.8	100.4	1	6	0	94	1
1	Candy (Sanitas Chocolates)	1	3.8	85.2	90	1.1	1	5	94	1
6⅖	Canteloupe	.7		10.9	11.6	8.6	5		70	¾
4	Caramel Cereal	.2	0	3.1	3.3	30.3	1	1	8	1/10
3	Caramel Custard	5.22	11.4	23.6	40.2	2.4	16	36	73	1¼
3¾	Carrots, Creamed	2.01	7.5	10.3	19.8	5.05	7	29	39	¾
3	Carrots, Italian	1.07	14.48	9.39	24.9	4.3	4	58	38	1
3	Carrots, Mashed	1.38	17.28	10.9	29.5	3.38	3	44	28	¾
½	Cashew Nuts	28.87	125.7	28.24	182.81	.54	15	70	15	1
1	Catsup, Grape	2.66	7.64	68.9	78.5	1.2	2	7	66	¾
3	Cauliflower au Gratin	4.2	31.4	6	41.6	2.6	13	94	18	1¼
3	Cauliflower, Buttered	1.2	30.5	3	34.7	2.88	2	90	8	1
3	Cauliflower, Creamed	2.5	15.7	6.4	24.1	3.8	7	48	20	¾
3	Cauliflower, Steamed	1	3.9	3	7.9	12.6	3	13	9	¼
1	Celery	1.3	.3	3.9	5.5	18.1	1		5	1/16
4¼	Celery, Creamed	1.9	11.9	4.6	18.5	4.2	8	48	19	¾
3⅝	Celery and Peas	3.3	9.9	9.8	23	4.8	12	32	31	¾
4¼	Celery, Stewed	1	6.87	3.92	11.83	8.5	5	29	16	½
2½	Cereal Roast	9.4	29.8	22.7	61.9	1.6	23	73	54	1½
2	Cheese, Cottage	19.9	12.4	5.1	37.3	2.6	40	25	10	¾
1¾	Cheese Croquettes	12	64.5	9.1	85.6	1.1	21	113	16	1½
½	Cheese, Yogurt	20.3	82.8	3.9	106.9	.9	10	38	2	½
2¼	Cherries	1.2	2.2	19.5	22.8	4.4	3	5	42	½
3¼	Cherries, White	1.2	2.2	19.5	22.8	4.4	4	8	63	¾
3	Cherry Sauce	1.2	2	29.4	32.6	3	4	6	90	1

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
4	Cherry Pie	7.83	27.97	49.16	84.96	1.2	30	100	195	3¼
2½	Chestnut Roast	9.94	21.4	47.3	78.6	1.27	26	54	120	2
2½	Chestnuts, Creamed	9.49	24.3	60.4	94.3	1.1	27	65	158	2½
2¾	Chestnuts and Tomato Sauce	9.2	16.2	60.1	85.5	1.2	30	50	170	2½
1¼	Chili Sauce	4.91	2.6	28.26	35.8	2.7	7	3	40	½
5	Cocoa, Sanitas Health (without sugar)	2.6	17.7	4.24	24.6	4.1	13	89	23	1¼
2	Cocoanuts	6.6	134.9	32.5	174	.6	13.2	269.8	65	3½
2½	Cornlet	3.7	2.9	23.2	29.8	3.3	9	7	59	¾
3	Cornlet au Gratin	4.16	21.5	22.9	48.6	2	13	66	71	1½
3	Corn, Baked	8.5	22.12	20.8	51.4	2	25	64	61	1½
3	Corn Cake	13.9	28.8	52.8	95.6	1	42	90	168	3
3	Corn, Creamed	3.8	6	16.8	26.6	3.7	11	17	47	¾
¾	Corn Flakes	10.8	1.4	91.3	103.5	.97	7	1	67	¾
2¾	Corn, Green Sweet (Cooked)	3.6	2.9	22	28.5	3.5	10	7	58	¾
4¼	Corn, Hulled	2.6	.5	20.7	23.8	4.2	11	2	87	1
2	Corn Pone	8	32.1	68.3	108.4	.92	11	59	130	2
2½	Corn Pulp	3.7	2.9	23.2	29.8	3.3	9	7	59	¾
2¾	Corn Roast	7.5	21.31	24.15	52.96	1.8	22	60	68	1½
2	Cottage Cheese	19.87	12.4	5.1	37.36	2.6	40	25	10	¾
1	Crackers, Fruit	13.2	27.2	72.6	113.1	.9	12	22	66	1
1	Crackers, Graham	11.7	25.1	86.1	122.9	.8	12	25	88	1¼
1	Crackers, Oatmeal	13.3	29.6	80.5	123.8	.8	14	30	81	1¼
1	Crackers, Whole Wheat	11.4	26	84.5	121.9	.8	12	27	86	1¼
3	Cranberries (Cooked)	.2	.7	47.8	48.7	2.1	1	2	147	1½
2	Cranberry Jelly	.4	1	49.7	51.1	1.9	1	2	97	1
2¼	Cream	2.9	49.3	5.3	57.5	1.7	6	107	12	1¼
2	Cream Molds	14.4	24.5	83.5	117.4	.8	27	53	195	2¾
1	Cream Sticks	10.9	9.9	89	100	.99	5	1	44	½
2¼	Cream Sauce	3.7	22.9	9	35.6	2.8	7	50	18	¾
3½	Cream of Wheat	1.7	.4	12.1	14.2	7	6	2	42	½
6	Cream Yogurt Whey	1.4	8.8	5.7	16	6.2	9	55	36	1
¾	Crisps, Cocoanut	9.3	52	64	125.4	.8	.8	41	51	1
2½	Crust, Shortcake	.94	12.6	2.7	16.24	5	5	35	10	½
5	Crust, Single Pie	26.7	44.9	42.2	113.8	.87	117	197	186	5
2	Cucumbers	.9	.5	3.6	5	20	2	1	7	1/10
3	Cucumber Jelly	.5	.3	3	3.8	26.3	1	0	9	1/10
3½	Cucumber, Stuffed	1.68	7.5	10.2	20.4	4.89	6	31	38	¾
3	Currents, Red	1.8		14.9	16.7	6	5	0	45	½
1	Currant Jelly	1.2		90.1	91.3	1.09	1		99	1
3	Custard, Bread Pudding	8.75	46.08	67.24	122.07	.81	23	133	194	3½
3	Custard, Caramel	5.2	11.4	23.6	40.2	2.4	16	36	73	1¼
4½	Custard, Plain	5.6	13	10.4	29.13	5	23	57	45	1¼
2½	Custard, Tapioca	4.5	17.6	26.4	48.3	2.1	12	45	68	1¼
3	Cutlets, Macaroni	13.82	28.49	32.35	74.6	1.3	41	86	98	2¼
2½	Cutlets, Nut	22.95	23.3	15.26	61.5	1.6	56	57	37	1½
2½	Cutlets, Nuttolene	16.27	32.66	13.58	62.5	1.6	40	80	30	1½
2	Cutlets, Protose	24.5	19.4	17.3	61.2	1.6	50	40	35	1¼
3	Dandelion Greens (Cooked)	2.8	2.7	12.5	18	5.5	8	8	34	½
4	Dasheen	7.3	.15	73.5	80.9	1.2	13	1	136	1½
4¼	Dasheen, Escalloped	5.55	14.07	39.71	59.33	1.7	25	75	150	2½
3½	Dasheen Shoots with Vegetable Sauce	5.28	18.24	5.84	29.96	3.5	15	65	20	1
3½	Dasheen Shoots, Creamed	6.1	34.26	7.52	47.95	2	25	120	30	1¾
2	Date Marmalade	1.75	14.5	62.6	78.9	1.3	3	28	119	1½
5¼	Date Pumpkin Pie	7	24.1	26	57.1	1.75	36	126	138	3
1¾	Dates	2.5	7.5	91.5	101.5	1	3	12	160	1¾
2	Dates Stuffed	4.6	27.7	82.4	114.7	.87	9	54	162	2¼

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
	DESSERTS—									
2½	Apple and Date Fluff	3	7.1	88.6	98.8	1	7	18	225	2½
2½	Apple, Grape	.5	1.3	45.9	47.7	2.1	1	4	120	1¼
3	Apple and Jelly	1.63	.98	38.3	40.9	2.45	5	3	117	1¼
2¾	Apple Lemon	.5	1.3	34.9	35.89	2.8	1	4	95	1
3¼	Apple Tart	4.76	11.19	41.7	57.6	1.7	14	33	128	1¾
4½	Apple Whip or Snow	5.5	1	13.9	22.4	4.4	25	5	70	1
3	Apricot Fluff	1.6	.33	14.6	16.5	6.6	5	1	44	½
4	Banana Dessert	2.1	7.4	23.4	32.6	3	8	27	90	1¼
3½	Banana Mold	.64	.68	28.4	29.76	3.3	2	2	96	1
3	Banana Snow	1.8	.4	25.4	27.6	3	4	1	70	¾
3½	Cake, Apple Sauce	5.33	32.37	79.93	117.60	.8	15	110	275	4
2	Cake, Cream	7.22	27.65	63.70	98.59	2	14	56	130	2
2	Cake, Cinnamon	7.6	26	76.3	109.9	9.9	13	47	240	3
2	Cake, Delicate	9.2	34.6	83.2	127.1	.76	18	68	164	2½
2	Cake, Frosted	6.8	24	74.9	105.7	.9	13.6	48	149.8	2 1/10
3	Cake, Jelly Roll	5.8	9.4	85.2	100.4	1	17.4	28.2	255.6	3
2½	Cake, Layer	8.2	45.9	76.5	130.6	.7	20	115	190	3¼
2½	Cake, Leather	6.8	3.9	120.4	131.1	7.6	17	8	300	3¼
2½	Cake, Light Fruit	5.8	30.4	59.4	95.7	1	10	71	144	2¼
2	Cake, Nut	9.1	35.2	67.1	111.4	.9	18	71	136	2¼
1¾	Cake, Nut Sponge	13.7	58.8	56	128.5	.7	24	103	98	2¼
1 3/3	Cake, Molasses	4.3	27.1	65.6	97.1	.1	4	35	86	1¼
1 2/3	Cage, Orange	7.8	15.6	66.9	91	1.09	13	26	111	1½
2	Cake, One Egg	7.42	28.91	75.91	112.24	.8	15	58	152	2¼
3½	Cake, Rocksberry	7.9	23.9	175.9	216.8	.4	22	100	228	3½
1½	Cake, Sponge	12.4	14.2	94.2	120.8	.8	20	23	157	2
2	Cake, White	10.58	55.52	90.13	156.2	.64	20	107	173	3
2	Cake, Whole	9.9	45.8	59.5	115.5	.86	19	90	116	2¼
3	Compote of Fruit with Rice	2.27	.31	26.5	29.1	3.4	5	1	69	¾
¾	Cookies	4.65	25.77	43.77	74.1	1.3	11	61	103	1¾
2	Cookies, Molasses	7.7	22.4	65.9	96	1	16	46	138	2
2	Cracker Crust	6.6	39	39.3	85	.1	16	79	80	1¾
3	Cream, Lemon	8.5	31	35.5	2	17	62	71	3	1½
3	Cream Puffs	9.3	43.6	30.3	83.2	1.2	28	131	91	2½
3½	Custard Cheese	18.5	14 9	10.1	43.5	2.2	63	52	35	1½
3	Custard Cocoanut	5.6	25.3	12.3	43.2	2.3	17	71	37	1¼
3¼	Custard, Cup	5.4	22.1	18.1	45.6	2.2	18	72	60	1½
2½	Custard, Tapioca	4.53	17.57	26.44	48.3	2	12	45	68	1¼
3	Date Surprise	3	12.23	20.9	36	2.9	6	35	59	1
3½	Frozen Peaches	.27	.88	29.45	30.7	3.2	1	2	97	1
3	Indian Trifle	3.64	9.4	23.3	36.4	2.74	10	27	63	1
4	Jellied Apricot	.63	0	23.4	24.12	4	4	0	96	1
3½	Jellied Peach	.58	31.48	24.6	28.12	3.5	2	13	85	1
3 3/3	Jelly, Cider	0	0	15.14	15.14	.6	0	0	50	½
4	Jelly, Red Raspberry	0	0	11.5	11.5	8.7	0	0	50	½
2½	Jelly Roll	54.7	12.67	67.8	134.5	.7	134	29	162	3¼
3	Jelley, Strawberry	0	0	6.6	6.6	6	0	0	50	½
½	Nuts, Cashew	28.8	125.7	28.2	182	.54	15	70	15	1
1	Nuts and Raisins	5.8	5.6	44	55.4	.1	13	132	105	2½
¼	Nuts, Pistachio	1.5	9.7	1.2	12.4	.8	6	39	5	½
3	Orange Fluff	1.77	.06	25.79	27.63	3.61	5	1	69	¾
1½	Parisian Sweets	8.1	55.9	65.4	129.4	.7	14	86	100	2
3	Peach Cobbler	4.33	21.68	39.34	65.35	1.5	13	66	121	2
4½	Pears, Baked	.68	4.26	27.2	32.14	3	5	21	124	1½
3	Pie, Apple and Date	2.6	7.2	91.34	101.2	.9	7	20	273	3
4¼	Pie, Banana, Raw	3.7	12.6	31.1	47.4	2.1	15	53	132	2
4	Pie, Banana and Raisin, raw	1.5	2.5	37.2	41.4	.2	10	15	150	1¾
4 ⅓	Pie, Pineapple	6.08	11.4	34.5	52	1.9	26	49	150	2¼

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
6	Pie, Sweet Potato	7.76	21.4	37.4	66.6	4.5	46	129	225	4
4	Pie, Vanilla Cream	12.7	29.7	40.7	83.2	1.23	49	117	159	3¼
3	Pineapple Cream Dessert	6.09	33.9	87.6	127.8	7	6	33	86	1¼
2½	Pineapple Popovers	7.8	17.3	31	56.2	1.8	20	46	84	1½
2½	Pineapple Roll	5.2	10.6	59.9	75.7	1.3	15	29	156	2
2½	Pineapple Bread	4.6	29.09	36.3	69.6	1.4	12	73	90	1¾
2¾	Pineapple Sponge	7.9	32.3	64 2	104.5	.9	13	64	123	2
2¼	Pineapple Tapioca	.36	.5	70	71.27	.69	1	1	223	2¼
3	Prune Fluff	1.5	8.7	23.7	33.3	2	5	26	69	1
3	Prune Souffle	3	.2	38.6	41.6	2.4	9	1	115	1¼
3	Pudding, Bread Custard	8.7	46.08	67.2	122.08	.81	23	133	194	3½
2½	Pudding, Cabinet	5.7	25.9	65.7	97.4	1	15	67	168	2½
2½	Pudding, Caramel Cornstarch	4.1	9.5	29.7	43.4	2.4	8	22	70	1
3½	Pudding, Steamed Cranberry	4.4	127.6	53.1	70.3	1.42	15	47	187	2½
2¾	Pudding, Christmas	6.21	9.06	59.69	74.9	1.3	17	24	159	2
2½	Pudding, Cottage	8.2	26.5	46.1	80.9	1.2	20	66	114	2
3½	Pudding, Fig Tapioca	.2	1.83	52.75	54.82	1.52	3	29	193	2¼
2¼	Pudding, Graham	6.6	7.5	74.6	88.7	1.1	15	17	168	2
3	Pudding, Log Cabin	4.34	15.96	45.2	70.5	1.4	13	48	139	2
3	Pudding, Orange	3.17	7.1	28.49	38.78	2.5	12	26	87	1¼
3	Pudding, Pineapple	1.04	13.7	29.2	44	2.5	4	47	99	1½
2½	Pudding, Pressed Fruit	2.4	5.9	30.9	39.3	2.5	6	15	79	1
3¼	Pudding, Queen	8.4	23.1	32.2	63.7	1.57	26	72	102	2
2	Pudding, Rice	5.2	6	80.2	91.5	1	10	12	153	1¾
2½	Pudding, Tapioca Custard	4.5	17.5	26.4	78.4	2	12	45	68	1¼
3	Pudding, Steamed Fruit	4.1	23.11	63.19	90.4	1.10	13	71	191	2¾
3	Pudding, St. James	6.2	19	80.4	105.6	.9	17	54	229	3
3	Pudding, Vevey	7	36	58	101	.9	20	107	173	3
3½	Raspberry and Banana Mould	.6	.6	17.6	18.8	5.2	4	4	67	¾
4	Rice and Banana	2.3	6.4	36.5	45.2	2.3	7	23	145	1¾
2	Rice with Cream Fluff	2.3	.3	32.4	35	2.8	6	1	68	¾
3½	Salpicon Fruit	0	0	3036.7	3036.7	.03	0	0	100	1
3⅛	Sherbet Grape	.86	14.6	24.8	40.36	2.4	2	45	78	1¼
3½	Sherbet Milk	2.5	7.4	32.8	42.7	2.3	9	26	115	1½
5	Shortcake, Pineapple	1.19	28.8	27.6	55.6	.17	5	132	138	2¾
5	Shortcake, Orange	1.3	29.39	18.7	29.5	2	7	148	95	2½
3½	Shortcake, Strawberry	6.5	1.7	33.4	41.7	2.3	23	60	117	2
¾	Sticks, Cocoanut	9.3	52	54	125.4	.8	8	41	51	1
3⅚	Strawberry Dessert	3	11.8	28.6	42.2	2.3	10	41	99	1½
4½	Strawberry Whip	5.4	.5	7.5	13.5	7.4	22	2	26	½
3	Strawberry and Banana Jelly	.33	.4	17.5	18.2	15.4	1	1	48	½
2½	Stuffed Figs	5.4	14.5	63	82.9	1.2	16	45	189	2½
¾	Vanilla Wafers	4.6	25.7	43.7	74.1	1.3	5	26	44	¾
4	Yogurt Ice Cream	2.2	6.1	15.9	24.2	4.1	10	25	65	1
2	Dressing for Roast	5.03	18.37	24.82	48.22	2.07	11	38	51	1
3	Egg Macaroni	5.44	20.7	9.34	35.5	2.8	15	59	26	1
2¼	Egg Mayonnaise Salad	13.37	30.66	1.46	44.49	2.25	30	69	1	1
3½	Egg Plant Creamed	7.1	35.2	35.3	77.6	1.28	25	125	125	2¾
3	Egg plant baked	6.57	28.3	33.5	68.4	1.46	19	81	100	2
2¼	Egg Sauce	4.8	22.7	8	35.5	2.82	10	47	18	¾
2¼	Eggs Alpine	10.6	56.8	1.1	68.5	1.8	43	128	4	1¾
2¼	Eggs baked in cream	27.7	66.5	2.6	96.9	1	28	69	3	1
3½	Eggs Boiled in Canapes	13	29.6	30.8	73.4	1.7	43	101	106	2½
4 ⅛	Eggs, Breaded	9.11	15.1	10.21	34.3	2.9	40	65	45	1½
2½	Eggs Escalloped	9.16	44.1	13.8	67.06	1.5	24	116	35	1¾
1¼	Eggs, Hard Jellied	16.3	32	0	48.3	2.1	29	46	0	¾
1¼	Eggs, Poached	16.3	32	0	48.3	2.1	29	46	0	¾
2	Eggs Poached in Corn Flakes	17	22.5	35.5	75	1.3	34	45	71	1½
2½	Eggs Poached on Rice Biscuits	13.6	17.6	38.8	70	1.4	34	44	97	1¾
2½	Eggs, Poached, on Toast	14.1	18.28	25.36	57.76	1.7	36	47	67	1½

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
2	Eggs, Scrambled	14.1	23.7	1.45	39.25	2.5	28	45	2	¾
3½	Eggs and Onions in White Sauce	4.07	18.89	10.14	33.11	3	16	69	40	1¼
3	Eggs Scrambled on Toast	12.3	16.3	21.4	50	2	37	49	64	1½
1¼	Eggs, Soft Jellied	16.3	32	0	48.3	2.1	29	46	0	¾
2 ⅓	Eggs, Spanish	9.1	31.3	3.04	43.47	2.33	21	72	7	1
4	Egg Timbale Rev.	8.23	18.4	3.7	3.2	30.33	34	76	15	1¼
4	Egg Timbales	9.3	30.2	4.1	43.5	2.4	38	120	17	1¾
1½	Egg Yolks Hard Boiled (2)	21.6	82.6	0	102.2	95	20	80	0	1
3½	Escarole Creamed	5.42	9.21	8.65	23.28	4.6	17	30	28	¾
3 ⅓	Eggnog, Foamy	8.8	27.6	14.2	50.4	2	31	93	51	1¾
2½	Eggnog, Lemon Flavor	12.4	.5	25.6	38.5	2.5	32	2	66	1
8	Eggnog, Milk	5.9	23	9	38	2.6	46	183	71	3
3	Endive	3.3	1	4.93	9.3	10.7	9	3	13	¼
½	English Walnuts	19.4	169.2	18.2	206.8	.47	9	82	9	1
3½	Farina	2.6	.8	18	21.4	4.7	9.1	2.8	63	¾
2½	Fig Marmalade	2.8	.4	48.7	57.9	1.9	6	1	118	1¼
2¾	Fig Pudding	4.7	15.3	34.7	54.7	1.83	12	42	96	1½
2	Figs	.5	8	79.7	83.5	1.2	5	1	144	1½
2	Figs, Steamed	4.6	.6	73.9	79.1	1	9	1	140	1½
3	Figs, Stewed	2.3	.4	49.4	52.1	1.92	6	1	143	1½
½	Filberts	18.2	174.1	15.2	207.5	.48	9	84	7	1
3	Floating Island	5.45	12.4	21.6	39.6	2.5	17	62	71	1½
½	French Salad, Dressing	0	198	2.85	200.9	.5	0	99	1	1
4	Frozen Malted Nuts	9.2	24.5	17	70.7	2	36	96	68	2
3⅛	Fruit Gelee	1.10	.5	38.1	39.7	2.5	3	2	120	1¼
6	Fruit Nectar	0	0	11.6	11.6	7	0	0	75	¾
2	Gems, Corn	9	22.2	21.7	72.1	1.3	20	56	84	1½
3½	Gems, Nut	10.1	37.2	46.8	94	1	35	129	161	3¼
3¼	Gems, Wheat	10	26.1	48.4	84.5	1.18	33	86	156	1¾
1	Gluten Biscuit, 40%	48.5	2.8	56.1	107.4	.9	45	3	52	1
½	Gluten Biscuit, 80 %	88.5	2.7	21	111.9	.9	41	1	8	½
5½	Gluten Mush	3.2	.3	14.68	8.2	5.4	18	1	81	1
4	Gluten Mush, Cream	5.5	27	16.5	49	2.5	22	111	67	2
¾	Golden Dressing	4	8.5	45	57.5	1.72	3	8	39	½
5	Good Health Breakfast Food	1.5	1.2	9	11.7	3.50	8	7	35	½
2½	Gooseberries, Stewed	.5		18.9	19.4	5.15	1		49	½
5¾	Graham Grits	2.1	.3	14.9	17.3	5.8	12	2	86	1
4¼	Graham Mush	2.6	.99	4	17.6	5.7	11	4	60	¾
5	Graham Mush with Dates	2.2	1.6	21.5	25.1	4	10	10	105	1¼
4½	Grains of Gold (Cooked)	1.7	.4	14.5	16.6	6	7	2	66	¾
1¼	Granola	15.6	1.1	85	101.7	.98	19	1	105	1¼
4¼	Granola Date Mush	3	1	25.2	29.2	3.42	12	4	109	1¼
4¼	Granola Fruit Mush	3.1	1.1	24.9	29	3.5	16	5	104	1¼
4½	Granola Mush	4.3	.3	23.6	28.23	3.55	20	2	103	1¼
¾	Granose Biscuit	14.1	1.9	83.6	99.6	1	10	1	64	¾
¾	Granose Flakes	13.4	1	83.8	98.2	1	10	1	64	¾
3¾	Grape Fruit	.9	.5	11.8	13.2	7.6	3	2	45	½
6	Grape Juice	0	0	23.8	23.8	4.2	0	0	150	1½
5	Grapes (Atwater)	1.16	3.2	16.6	20.9	4.7	5	16	79	1
3	Grapes, Cooked	.88	2.43	34.8	38.7	3	2	6	92	1
1¾	Granuto	19.1	5	91.8	115.5	.87	32	8	160	2
1	Gravy, Brown Nut	7.8	11.5	4.9	24.2	4.15	8	12	5	¼
1½	Gravy, Creamed Gluten	4.3	17.8	9.4	31.5	3.12	7	28	15	½
6	Gruel, Baked Potato	.7	5.7	5.7	12.2	8.2	5	35	35	¾
5	Gruel, Baked Potato Cream	1.8	19.8	7.9	29.5	3.3	8	101	41	1½
6	Gruel, Barley	1.48	.7	10.2	12.39	8.07	9	4	62	¾
6½	Gruel, Corn Flakes	.7	.9	6.1	7.7	13	4	6	40	½
6¼	Gruel, Corn Meal	.8	.4	6.8	8.	12.5	5	3	42	½

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
5¼	Gruel, Cream Gluten	4.3	20.3	12.9	37.5	2.7	23	108	69	2
5	Gruels, Creamed Cracker	1.7	15.7	4.6	20.2	4.9	8	69	23	1
4¾	Gruel, Farina	1.4	.04	9.1	10.5	9.5	6	1	43	½
6	Gruel, Granola	2.7	.9	12	15.6	6.6	18	6	76	1
8	Gruel, Granose Flakes	.8	.06	4.9	5.7	17.5	7	1	42	½
6	Gruel, Oatmeal	1.3	1.4	5.8	8.5	11.7	7	8	35	½
6	Gruel, Plain Gluten	9.3	.5	10.2	20	6	17	2	81	1
6	Gruels, Potato, Baked	.7	5.7	5.7	12.2	8.19	5	35	35	¾
4½	Gruel, Potato Meal	1	.1	10.2	11.3	8.9	4	1	45	½
6	Gruel, Rice	.7	1.2	5.8	7.7	12.9	4	8	38	½
5	Gruel, Savory Potato Meal	2.9	10.7	11.9	25.9	3.8	13	53	59	1¼
6	Gruel, Taro	3.7	10.2	1.5	12.2	8	3	62	10	¾
6	Gruel, Taro Cream	.83	17.5	2.2	20.4	4.8	5	106	14	1¼
8	Gruel, Wheat Flake	.64	.22	5.22	6.1	16.3	5	1	44	½
3	Hash, Potato and Celery	2.66	9.66	21	33.3	3	8	29	63	1
3¼	Hash, Potatoes and Onions	2.35	10.79	17.63	30.7	3.25	7	36	57	1
3	Hash, Protose	8	4.3	21.1	33.4	3	24	13	63	1
2¾	Hash, Vegetable	2.5	7.1	17.4	27	3.7	6	20	49	¾
2	Hoecake	9.96	45.8	59.5	115.3	.9	19	90	116	2¼
4¼	Hominy	2.6	.5	20.7	23.8	4.2	11	2	87	1
4¼	Hominy, Creamed	5	14.4	35.7	54.6	2	20	60	145	2¼
2½	Hominy Croquettes	5	8.3	25.7	39	2.5	13	22	65	1
4½	Hominy Grits	1.7	.4	14.5	16.6	6	7	2	66	¾
1⅝	Honey	.5	0	94.7	95.2	1	1	0	149	1½
4¼	Hulled Corn	2.6	.5	20.7	23.8	4.2	11	2	87	1
5¾	Hulled Wheat	3.3	1	22	26.3	3.8	18	6	126	1½
3½	Jellied Peach	.58	3.48	24	28.1	3.55	2	13	85	1
3	Jelly, Cherry			16	16	6			50	½
2¾	Jelly, Chocolate	3	14.9	17.4	35.3	2.84	9	42	49	1
2	Jelly, Cranberry	.38	1.01	49.7	51.1	1.9	1	2	97	1
3	Jelly, Cucumber	.5	.3	3	3.8	26.3	1		9	1/10
1	Jelly, Currant	1.2		90.1	91.3	1.09	1		99	1
3	Jelly, Lemon			30.57	30.57	3.2			100	1
2¾	Jelly, Orange			36.4	36.4	2.74			100	1
3	Jelly, Orange and Pineapple	.43	.23	24.5	25.1	4	2		73	¾
3	Jelly, Pineapple			41.06	41.06	2.4			125	1¼
4	Jelly, Tomato	3.2	1.7	9.21	14.2	7	11	7	32	½
5	Kumyss	3.3	5.6	6.3	15.2	6.6	16.5	28	31.5	¾
1¼	Lemon Sauce			37.3	37.3	2.7			50	½
5½	Lemonade			14.2	14.2	7			75	¾
2½	Lemonade Nog	12.4	.48	25.6	38.4	2.5	32	2	66	1
3	Lentil and Potato Loaf	5	6.2	27	38.3	2.7	18	22	85	1¼
3	Lentils (Baked)	8.23	3.13	19.38	30.76	3.3	26	12	12	1
4½	Lettuce and Celery Stew	1.2	4.5	6.87	12.12	9.6	5	16	29	½
1¼	Lettuce with Lemon	1.1	.6	5	6.7	15	2	1	7	1/10
2½	Macaroni and Cheese	6.2	25.2	12.8	44.3	2.5	13	59	28	1
2½	Macaroni and Cornlet	4.02	6.9	11.86	22.7	4.4	9	15	26	½
3	Macaroni Croquettes	13.82	28.4	32.35	74.6	.3	41	86	98	2¼
4	Macaroni and Kidney Beans	4.4	6.36	12.6	23.4	4.6	19	29	52	1
3	Macaroni and Tomato	5.06	3.86	17.16	26.08	3.8	15	11	49	¾
3½	Macaroni in Tomato Sauce	1.4	8.7	6.6	16.9	6.09	3	27	20	½
2¾	Macaroni au Gratin	10.8	15.82	15.88	44.8	2.45	30	45	50	1¼
3	Macaroni Cutlets	13.8	28.4	32.35	74.6	1.3	41	86	98	2¼
3	Macaroni, Egg	5.44	20.7	9.34	35.5	2.81	15	59	26	1
1	Malt Honey Caramels	5.6	0	94.8	100.4	1	6	0	94	1
1¼	Malt Honey Whip	1.1	0	80	81.1	1.2	1	0	99	1
1	Malted Milk (Horlicks)	19.7	23.4	79.2	121.7	8	20	24	81	1¼
1¼	Malted Nuts	27.6	73.6	51.2	152.4	.65	36	96	68	2
5¾	Malted Nuts, Cream	8.3	28	15.4	51.7	1.9	48	163	89	3
6	Malted Nuts, Egg Nog	10.8	25.2	13.65	49.6	2	65	153	82	3

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Portions	Calories Served		
		Proteins	Fats	Carbohydrates	Total			Fats	Carbohydrates	Portions served
4	Malted Nuts, Frozen	9.2	24.5	17	50.7	2	36	96	68	2
1¼	Malted Nuts, Hot	27.6	73.6	51.2	152.4	.65	36	96	68	2
2	Maltol	0	88	58.3	146.3	.7	0	220	80	3
1	Maple Sugar	0	0	96.6	96.6	1.1	0	0	100	1
1¼	Maple Syrup			83	83	1.2			100	1
2½	Marmalade, Fig	2.8	.4	48.7	51.9	1.9	6	1	118	1¼
2¼	Marmalade, Prune	.8	.3	43.9	45	2.2	2	1	97	1
1½	Mayonnaise, Cooked	6.87	67.1	2.85	76.8	1.3	9	88	3	1
2¼	Meltose or Malt Honey			86.2	86.2	1.16			200	2
¾	Meltose Sauce	1.1	.04	80.6	81.2	1.23	1		49	½
1½	Meltose with Butter	.33	62.9	62.2	125.5	.7		100	100	2
1¼	Meltose, whipped	1.1	.04	80	81.14	1.2	1		99	1
6½	Milk, Skimmed	4	.8	6	10.8	9.3	26	5.2	39	¾
6	Milk, Whole	3.8	11	5.8	20.6	4.85	23	67	35	1¼
2	Muffins, Bran	8.8	34.8	28.1	71.8	1.3	18	73	59	1½
4¼	Baked Mush	5	5	26.1	35.1	2.77	27	21	108	1½
5	Nectarines	.4	0	14.6	15	6.6	2	0	73	¾
2	New England Stew	6.6	6.3	10.4	23.3	4.3	14	14	22	½
2½	Normandy Loaf	15.5	44.3	18.1	77.9	1.3	39	114	47	2
2½	Nut and Vegetable Stew	6.3	6.36	8.7	21.3	4.6	15	15	20	½
⅞	Nut Butter	34.2	124	20	178.2	.6	28	105	17	1½
2¼	Nut Normandy Chops	4.42	19.6	34.9	58.9	1.4	12	65	73	1½
2½	Nut Chops	9.4	26.4	37.4	73.2	1.4	22	64	89	1¾
2	Nut Croquettes	18.6	21.8	9.15	49.6	1.55	38	44	18	1
2½	Nut Cutlets	22.9	23.3	15.26	61.5	1.6	56	57	37	1½
2¾	Nut Fillet	15.11	14.88	16.6	46.6	2.14	41	40	44	1¼
2	Nut Fillet (new)	22.89	34.47	16.8	74.1	1.3	38	58	29	1¼
2¾	Nut Fillets	15.1	14.9	16.6	46.6	2.14	41	40	44	1¼
1	Nut Gravy	7.8	11.5	4.9	24.2	4.15	8	12	5	¼
2½	Nut Irish Stew	8.9	8.99	12.31	30.25	3.3	22	22	31	¾
2¾	Nut Loaf with Peas	18.2	16.91	11.31	46.4	2.15	48	46	31	1¼
3¾	Nut Meat Fillet	12.9	18.18	16.51	47.6	2.1	48	66	61	1¾
4½	Nut Meat Loaf	11.7	17.2	12.4	41.3	2.3	44	106	50	2
3¼	Nut Meat Pie	15	18.4	30.7	64.2	1.6	47	58	95	2
2	Nut Patties	18.6	21.85	9.15	49.6	1.55	38	44	18	1
1¾	Nut Patties	2.6	.5	20.7	23.8	4.2	7	2	41	½
2½	Nut Patties—Tomato Sauce	15.1	20.8	8.4	44.4	2.2	34	47	19	1
3	Nut and Rice Patties	13.25	9.64	17.7	40.6	2.46	40	29	56	1¼
3	Nut Ragout	8.97	27.14	6	41.5	2.4	26	81	18	1¼
2	Nut Sausage	18.62	51.01	11.52	81.6	1.2	30	100	20	1½
2½	Nut Steak with Gravy	18.9	25	9.7	53.6	1.8	53	71	26	1½
¼	Nuts, Almonds	24.5	146.4	20.2	191.1	.52	7	38	5	½
¼	Nuts, Almonds Salted	24.5	146.4	20.2	191.1	.52	7	38	5	½
½	Nuts, Beech	25.5	153.1	15.4	194	.5	12.7	76.5	7.7	1
½	Nuts, Butter	32.5	163.2	4.1	199.8	.5	16.2	81.6	2	1
½	Nuts, Brazil	19.8	178.1	8.2	206.1	.48	9	87	4	1
½	Nuts, Filberts	18.2	174.1	15.2	207.5	.48	9	84	7	1
½	Nuts, Hickory	18	179.7	13.3	211	47	9	89.8	6.6	1
½	Nuts, Pecans	11.2	188	17.8	217.8	.46	5	87	8	1
½	Nuts, Pine	39.5	131.7	8	179.2	.55	23	72	5	1
½	Nuts, Pine, Salted	39.5	131.7	8	179.2	.55	23	72	5	1
½	Nuts, Walnut, Eng.	19.4	169.2	18.2	206.8	.47	9	82	9	1
2	Nuttolene	14.4	27.7	8.1	50.2	2	29	55	16	1
3	Nuttolene-Apple Sauce	9.7	18.9	13.3	42	2.38	29	56	40	1¼
3	Nuttolene-Apricot Sauce	10	18.4	22.2	50.6	2.45	31	57	37	1¼
2¾	Nuttolene and Bechamel Sauce	12.3	30.5	11.6	54.4	1.8	34	84	32	1½
2	Nuttolene, Baked	13.45	31.2	12.14	56.87	1	25	53	22	1
2	Nuttolene Broiled	14.4	27.7	8.1	50.2	2	29	55	16	1
2	Nuttolene-Chili Sauce	14.4	27.7	8.1	50.2	2	29	55	16	1

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
3	Nuttolene-Cranberry Sauce	9.7	18.8	17.2	45.7	2.17	28	51	46	1¼
2¾	Nuttolene a la Cream	10.3	27	8.4	45.7	2.2	28	74	23	1¼
2	Nuttolene Croquettes	12.6	36.4	16	64	1.8	25	70	30	1¼
2½	Nuttolene Cutlets	16.2	32.66	13.8	62.5	1.6	40	80	30	1½
2½	Nuttolene Fricassee	10.35	23.18	6.9	40.43	2.5	25	56	19	1
2½	Nuttolene and Hollandaise Sauce	12	41.2	6.8	60	1.6	30	103	17	1½
2½	Nuttolene and Jelly	12	22	26	60	1.6	30	55	65	1½
2	Nuttolene-Mint Sauce	14.4	27.7	8.1	50.2	2	29	55	16	1
2½	Nuttolene and Piquant Sauce	13.2	36.4	11.4	60	1.6	33	91	26	1½
2½	Nuttolene and Tomato Sauce	15.1	20.8	8.4	44.4	2.2	34	47	69	1½
4¼	Oatmeal (Cooked)	3.3	1.3	13.4	18	5.6	14	5	56	¾
1¾	Oatmeal Stones	9.9	19.4	41.2	70.6	1	18	34	73	1¼
1	Oatmeal Wafers	13.3	29.6	80.5	123.8	.8	14	30	81	1¼
4¼	Oats, Rolled (Cooked)	3.3	1.3	13.4	18	5.6	14	5	56	¾
5	Okra and Tomatoes	1	2.4	4.3	7.7	14.2	3	8	14	¼
⅓	Olive Oil	0	264.1	0	264.1	.4	0	100	0	1
1 ⅓	Olives, Ripe (7)	2	69.1	5	76.1	1.3	2	91	7	1
4	Omelet	14	59	1	74	1.4	56	236	4	3
3	Onion Duchesse	4.49	33.8	4.9	43.26	3	12	100	13	1¼
3	Onions, Baked	3.16	11.6	18.98	33.7	2.96	9	34	57	1
2½	Onions, Boiled	.73	4.1	3.3	8.1	12.1	3	12	10	¼
3	Onions, Creamed	1.73	14.6	5.6	21.9	4.5	6	50	19	¾
3	Onions, Escalloped	2.7	8	9.6	20.3	5	10	30	35	¾
4¼	Onions on Toast	4	6.4	21.2	31.6	2.8	15	25	85	1¼
5	Orange Juice	0	0	15.1	15.1	6.6	0	0	75	¾
1	Orange Marmalade	8	2	99	109	1	8	2	99	1
1	Orange Sauce	2.6	32.25	68.7	103.5	.96	2	32	66	1
7¼	Orange Yogurt	2.7	55	12.3	15.6	5.8	22	5	98	1¼
5	Oranges	.9	.5	13.5	14.9	6.7	4	2	69	¾
5	Oranges, Blood	.9	.5	13.5	14.9	6.7	4	2	69	¾
3	Parsnips, Browned	2	11.85	11.31	25.2	3.9	6	36	33	¾
3	Parsnips, Creamed	2.56	6.5	17.29	26.35	3.8	7	16	52	¾
2½	Parsnips, Escalloped	6.1	10	19.1	35.2	2.7	13	22	40	¾
3	Parsnips, Mashed	1.7	5.9	9.5	17.1	5.8	5	17	28	½
3¾	Patties, Peas	13	18.4	23.4	54.8	1.8	48	66	86	2
2½	Patties, Rice	21.23	54.02	40.5	115	.83	20	43	37	1
5	Peach Juice	0	0	20.8	20.8	4.8	0	0	100	1
4	Peaches, Fresh	.9	.3	11.6	12.8	7.8	3	1	46	½
3½	Peaches, Cooked	.9	.3	19.7	20.9	4.8	3	1	71	¾
¾	Peanuts	30.1	102.9	8.5	161.5	.6	22.5	77.1	6.3	1
6	Pear Juice	0	0	25.6	25.6	3.9	0	0	150	1½
4	Pears	.7	1.3	16.5	18.5	5.4	3	5	67	¾
4	Pears, Cooked	.7	1.1	23.3	25.1	4	3	4	93	1
3	Peas, Creamed	6.36	9.9	13.74	30	3	16	24	35	¾
3	Peas, English Style	7.8	9.1	17.5	34.4	3	23	26	51	1
3	Peas in Cream	6.16	22.5	13.83	42.5	2.3	18	63	41	1¼
3½	Peas Creamed on Toast	6.49	13	26.24	45.75	2.18	20	44	86	1½
3	Peas, Green	7.8	9.1	17.5	34.4	3	23	26	51	1
3½	Peas, and New Potatoes	4.68	9.86	21.13	35.68	2.8	16	35	74	1¼
3¾	Peas, Pattie	13	18.4	23.4	54.8	1.8	48	66	86	2
3	Peas, Purée	8.5	9	17.5	35	3	24	26	50	1
3	Peas and Rice Croquettes	5.6	3.3	28	36.9	2.9	12	26	62	1
½	Pecans	11.2	188	17.8	217.8	.46	5	87	8	1
4¼	Persimmons	.95	1.86	36.7	39.5	2.5	4	9	162	1¾
4⅜	Pie, Apple	7.18	16.7	35.18	59.1	1.6	32	78	165	2¾
4	Pie, Blackberry	8.18	14.36	43.1	66.64	1.5	43	77	230	3½
4	Pie, Blueberry	5.2	12.7	47.4	65.3	1.5	20	49	181	2½
3⅞	Pie, Cocoanut Cream	6.46	23	31.31	16.85	1.65	21	76	103	2
4	Pie, Custard	4.9	16.8	30.5	52.2	1.9	20	64	116	2

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
4	Pie, Cherry	8	14.6	46	68.6	1.46	33	58	184	2¾
4	Pie, Date Cream	10.31	21.4	21.9	73.7	1.3	42	87	171	3
5¼	Pie, Date Pumpkin	7	24.1	26	57.1	1.76	36	126	138	3
4	Pie, Lemon	7.94	26.9	38.7	73.54	1.3	35	120	170	3¼
5	Pie, Mince	15.09	22.2	35.1	72.4	1.3	73	108	169	3½
4	Pie, New England Cream	6.42	23.7	29.8	59.9	1.6	22	90	113	2¼
3¾	Pie, Orange (1-6 Pie)	11.39	19.31	35.67	66.3	1.5	43	73	134	2½
5	Pie, Pumpkin	3.25	7.26	24.88	35.4	2.8	36	71	168	2¾
5	Pie, Raspberry	8.18	14.36	43.1	65.64	1.5	43	77	230	3½
5½	Pie, Squash	4.27	22.7	36.5	63.5	1.58	21	126	203	3½
2	Pine Nut Roast	22.7	60.5	26.3	109.5	.91	45	128	52	2¼
½	Pine Nuts	39.5	131.7	8	179.2	.55	23	72	5	1
4	Pineapple, Fresh	.5	.8	11.3	12.6	8	2	3	45	½
5	Pineapple Juice	0	0	21.8	21.8	4.5	0	0	100	1
3½	Pineapple Sauce	.57	.85	29	21.4	4.6	2	3	70	¾
4	Plums	1.2		23.5	23.7	4	5		95	1
2¾	Plum Sauce	1.1		31.3	37.4	2.67	3		97	1
½	Popped Corn	12.5	13.3	91.8	117.6	.85	5	5	40	½
2¼	Potato Cakes	6.3	17.61	31.48	55.4	1.8	14	40	71	1¼
3	Potato au Gratin	5.97	18.3	20.4	44.7	2	17	51	57	1¼
3	Potato, Baked Sweet	4.11	11.25	59.7	75	1.34	12	33	180	2¼
4	Potato Balls	4.5	18	17.5	40	2.5	18	112	70	2
3	Potato Cakes and Protose	5.6	25.8	21	52.2	1.9	17	73	60	1½
4¾	Potato Chowder	2.7	17	10.4	30.1	3.3	13	86	51	1½
3½	Potato Loaf	4	15	17.34	36.5	2.7	14	52	59	1¼
2¼	Potato Croquettes	6.3	17.61	31.4	55.4	1.8	14	40	71	1¼
2½	Potato Salad	4.56	25.77	15.06	45.3	2.1	10	57	33	1
3	Potatoes, Baked	3.4	.4	28.9	32.7	3.06	11	1	88	1
3	Potatoes, Boiled	2.9	.3	24.4	27.6	3.5	7	1	67	¾
3¼	Potatoes, Browned	3.48	5.17	29.12	77	2.6	11	17	97	1¼
3	Potatoes, Cream Baked	3.7	8.1	23.4	35.2	3	10	22	68	1
3½	Potatoes in Cream Sauce	3.2	12.87	18.74	34.81	2.8	11	46	68	1¼
4¼	Potatoes, Escalloped	3.6	10.7	21	35.3	2.75	15	45	90	1½
3¼	Potatoes, Glazed	3.5	5.17	29.4	38.07	2.6	11	17	97	1¼
2¾	Potatoes, Hashed	2.8	13.4	22	38.2	2.6	8	35	57	1
2¾	Potatoes, Hashed Cream	2.9	19.27	21.9	44.15	2.2	9	54	62	1¼
4¼	Potatoes, Hashed, and Poached Eggs	11.7	12.9	14.8	39.4	2.6	50	58	67	1¾
2¾	Potatoes, Hashed Browned	2.8	13.4	22	38.2	2.6	8	35	57	1
3	Potatoes in Jackets	2.9	.3	24.4	27.6	3.5	7	1	67	¾
3	Potatoes, Lyonnaise	2.4	28.7	17.9	49	1.3	9	86	55	1½
3	Potato and Celery Hash	2.66	9.66	21	33.3	3	8	29	63	1
3½	Potatoes (creamed), Sweet	5.5	22.4	27	54.9	1.8	20	82	98	2
2¾	Potato Croquettes, Sweet	3.36	16.76	41.6	61.65	1.6	9	47	119	1¾
3¼	Potato and Onion Hash	2.35	10.79	17.63	30.7	3.25	7	36	57	1
3	Potato and Rice Croquettes	3.1	1.8	22.6	27.5	3.6	7	5	63	¾
3¼	Potatoes, Mashed	3	8	20.8	31.8	3.14	9	25	66	1
3½	Potatoes, Mashed Sweet	3.5	5.6	49.1	58.2	1.71	12	19	169	2
3	Potatoes, Minced	3.02	10.96	21.55	35.51	2.8	8	30	62	1
3½	Potatoes, New Creamed	3.2	12.87	18.74	34.81	2.8	11	46	68	1¼
3¾	Potatoes, New, with Peas	4.46	7.75	21.84	34.1	2.93	16	29	80	1¼
3	Potatoes, Parisian	2.3	13.16	15.72	31.1	3.1	7	42	51	1
3¾	Potatoes, Savory	2.2	4.9	20	27.1	3.7	8	18	74	1
3¼	Potatoes, Sliced in Cream	3.94	17.92	15.48	37.34	2.6	13	60	52	1¼
3	Potatoes, Steamed	2.9	.3	24.4	27.6	3.5	7	1	67	¾
1	Potato Rosettes	8	38	54	100	1	4	19	27	½
3½	Potatoes, Stuffed	4.2	21.1	30.2	55.5	1.8	14	66	95	1¾
3	Potatoes, Sweet, Browned	4.11	11.25	59.7	75	1.34	12	33	180	2¼
1¾	Pressed Meat	23.9	42.2	9.2	75.3	1.3	45	65	15	1¼
2	Protose	22.8	16	10.2	49	2	47	33	20	1

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
4	Protose, Braized	13	12.17	6.22	31.4	3.1	53	48	24	1¼
3	Protose, Breslau of	19.9	30.1	7.6	57.7	1.8	61	91	23	1¾
2	Protose, Broiled	22.8	16	10.2	49	2	47	33	20	1
2¾	Protose Broiled with Mushroom Sauce	17.5	20	8	45.5	2.1	48	55	22	1¼
3	Protose Creamed on Toast	10.6	20.1	26.56	57.28	1.7	32	61	82	1¾
2½	Protose, Chipped in Cream	13.61	31.36	7.93	52.9	1.9	32	75	18	1¼
2	Protose Cutlets	24.5	19.4	17.3	61.2	1.64	50	40	35	1¼
1½	Protose Croquettes	22.8	16	10.2	49	2	7	135	33	1¾
4	Protose Fillet	12.06	12.8	9.93	34.73	2.8	43	46	36	1¼
3	Protose Hash	8	4.3	21.1	33.4	3	24	13	63	1
2¼	Protose and Mayonnaise	21.6	22.2	9.2	52.9	1.89	50	52	23	1¼
3	Protose, Minced on Toast	11.88	22.77	7.52	42.1	2.37	35	68	22	1¼
2¼	Protose, Panned	21.2	22.7	12.6	56.5	1.76	47	50	28	1¼
2	Protose Patties	18.6	21.85	9.15	49.6	1	38	44	18	1
2	Protose, Potted	22.8	16	10.2	49	2.8	47	33	20	1
2½	Protose and Rice Croquettes	15.13	10.56	22.77	48.46	2.05	39	27	59	1¼
2½	Protose Roast	47.7	41.9	28.4	117.9	.78	31	29	40	1
4½	Protose Roast with Dressing	12.8	17.5	17	47.3	2.1	59	84	82	2¼
2½	Protose Steak with Gravy	18.9	2.5	9.7	53.6	1.8	53	71	26	1½
2½	Protose Steak with Onion	19.24	20	11.76	51	2	47	49	29	1¼
3	Prune Fritters	3.4	10.5	24	37.9	2.8	14	35	76	1¼
2¼	Prune Marmalade	.8	.3	43.9	45	2.2	2	1	97	1
3¾	Prunes (Cooked)	.8	.3	26.4	27.5	3.65	3	1	96	1
2½	Pudding, Baked Indian	4.8	21.8	20	46.6	2.1	13	58	54	1¼
3½	Pudding, Bread	6.44	32	19.12	57.56	1.75	22	112	66	2
3½	Pudding, Chocolate	4.95	23.5	30.38	58.83	1.7	16	80	104	2
3¼	Pudding, Cream Rice	4.25	22.1	19.63	45.98	2.1	14	72	64	1½
2½	Pudding, Date	7.2	23.3	66.75	97.2	1	20	60	170	2½
2¾	Pudding, Fig	4.7	15.3	34.7	54.7	1.83	12	42	96	1½
3½	Pudding, Sago	.53	.73	27.17	28.4	3.52	2	2	96	1
2½	Pudding, Snow	4.78	9.22	16.37	30.38	3.33	11	23	41	¾
2½	Pudding, Apple Tapioca	4.5	17.58	26.44	48.5	2.07	12	45	68	1¼
3½	Puffs, Chocolate	9.9	28.5	48.2	86.7	1.9	34	99	167	3
2	Puffs, Cocoanut	9.52	32.49	59.84	92.85	1.08	22	80	123	2¼
3¼	Puffs, Corn	12.5	26.8	49.2	88.5	1.1	42	90	168	3
3½	Puffs, Currant	6.6	23.2	49.7	79.6	1.2	22	80	173	2¾
2¾	Puffs, Fig	8.5	22.67	48.9	79.93	1.26	28	77	170	2¾
3½	Puffs, Graham	10	27	50.39	87.39	1.15	35	93	172	3
3½	Puffs, Nut	10.1	37.2	46.8	94.1	1.06	35	129	161	3¼
3½	Puffs, White	9.4	26.5	50.3	86.2	1.16	29	84	162	2¾
3¼	Puffs, Whole Wheat	10	26.1	48.4	84.5	1.18	33	86	156	2¾
3¾	Quince Sauce	.48	.51	19.9	20.09	5	2	2	71	¾
1	Radishes	1.5	.3	6.7	8.5	11.7	1		5	1/16
1	Raisins	3	8.8	88.8	100.6	1	3	9	88	1
3	Raisins, Cooked	2	5.8	57.6	65.4	1.53	6	18	176	2
4	Raspberries, Fresh Black	2	2.6	14.7	19.3	5.2	8	10	57	¾
3¼	Raspberries, Fresh Red	1.2		14.7	15.9	6.3	4		46	½
5	Raspberry Juice (Black)	0	0	29.4	29.4	3.4	0	0	150	1½
5	Raspberry Juice (Red)	0	0	23.7	23.7	4.2	0	0	125	1¼
3¼	Raspberry Sauce, Black	1.6	2.2	27.5	31.3	3.25	5	7	88	1
3¼	Raspberry Sauce, Red	1.2		22	23.2	4.3	4		71	¾
1	Rice Biscuit	8.5	.9	96.6	106	.94	7	1	92	1
3	Rice a la Carolina	4.41	20.7	24.07	49.28	2.02	13	63	74	1½
4	Rice, Boiled	3.3	.3	28.5	32.1	3.1	13	1	111	1¼
4½	Rice, Browned	3.88	.34	39.72	43.94	2.27	16	2	182	2
3	Rice and Cheese	6.3	18.9	23.1	48.3	2	20	59	71	1½
5½	Rice with Creole Sauce	2.99	11.61	21.8	36.39	2.7	16	64	120	2
2¼	Rice Croquettes	4.08	6.04	35.6	45.7	2.2	9	13	78	1
2	Rice Cutlets	10.3	8.7	48.2	67.2	1.5	19	16	90	1¼

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
½	Rice Flakes	8.5	.9	96.6	106	.94	3		47	½
3	Rice Patties with Sauce	7.75	17.02	14.4	33.9	2	25	57	43	1¼
2½	Rice Patties	21.23	54.4	40.5	115	.83	20	43	37	1
2¼	Rice and Peas	5.01	25.29	28	59	1.69	10	57	58	1¼
½	Rice, Puffed	9	.8	92	101.8	.98	4		46	½
5	Rice with Raisins	2.99	.99	25.98	29.96	3.4	12	5	133	1½
4¼	Rice, Steamed or Creamed	3.28	9.91	21.18	34.37	2.9	14	42	94	1½
5	Rice, Steamed and Raisins	2.99	.99	25.9	28.9	3.4	12	5	133	1½
2¾	Rolls, Cocoanut	9.3	52	64.1	125.4	.8	28	144	178	3½
2	Rolls, Cream	11.4	22.5	83.5	117.4	.8	27	53	195	2¾
2½	Royal Scallop	20.6	52.8	14.9	88.3	1.2	53	134	38	2¼
2	Rutabagas, Baked	5.3	29.9	64.7	100.9	1	12	59	129	2
4	Rutabagas, Mashed	.6	2.8	2.7	6.1	16.4	2	12	11	¼
1½	Salad, Apple and Celery	2.26	4.27	26.16	32.69	3.5	4	6	40	½
1½	Salad, Apple, Cheese and Nut	9.41	59.2	39.44	108.7	.94	10	84	56	1½
2¼	Salad, Banana Cherry Sauce	1.5	1.9	32.5	35.9	2.78	3	3	69	¾
1¼	Salad, Banana Mayonnaise	3.4	18.3	26.41	48	2.06	3	19	28	½
1½	Salad, Banana and Walnut	5.34	40.3	20.7	66.5	1.5	8	60	32	1
1¾	Salad, Bean, String and French Dressing	.7	51.7	2.3	54.7	1.8	2	93	5	1
4	Salad, Beet and Bean	3.01	17.7	5.2	25.91	3.9	11	69	20	1
1¼	Salad, Beet and Lemon	.97	.10	3.6	4.7	5.3	2	1	10	⅛
2¼	Salad, Beet and Potato	4.27	16.56	14.21	35	2.85	9	36	30	¾
4 ⅔	Beets in Aspic and Mayonnaise	3.1	10.5	3.2	16.8	5.9	14	46	15	¾
3	Salad, Beets and Mayonnaise	3	15	7	25	14.2	9	45	21	¾
2½	Salad, Berkley	.57	.72	22.4	23.7	4.6	1	1	48	½
2	Salad, Cabbage	2.6	15.66	8	25.72	3.8	4	30	16	½
2	Salad, Cabbage and Celery	1.93	15.55	7.46	24.9	4	3	33	14	½
2	Salad, Cabbage, Chopped	1.9	18.2	17.2	37.5	2.6	4	37	34	¾
2¼	Salad, Cabbage-Lemon	.63	2.35	2.8	5.78	17.1	1	5	6	⅛
1½	Salad, Cabbage and Olive	2.3	72.6	4.8	79.7	1.5	4	113	8	1¼
2	Salad, Carrot	2.4	14.3	9.2	26.1	3.7	4	28	18	½
3	Salad, Carrot, raw	3.1	30.2	12.9	46.2	2.6	8	84	33	1¼
1½	Salad, Carrot and Nut	4.7	81.2	9.4	95.2	1.1	10	125	15	1½
2	Salad, Cauliflower	2.5	19.7	3	25.2	4	4	40	6	½
2	Salad, Celery No. 2	1.5	61.8	3.1	169	1	3	116	6	1¼
1	Salad, Celery	1.3	.3	3.9	5.5	18.1	1	0	5	⅙
2	Salad, Celery No. 1 with Mayonnaise	2.5	13.9	3.3	19.6	5.1	7	34	9	½
1½	Salad, Celery Relish	2.8	1.5	3.5	17.8	5.6	4	1	20	¼
¾	Salad, Cheese Balls	21.3	105.3	6.6	134.2	6.6	16	79	5	1
1¼	Salad, Chili Sauce	4.91	2.6	28.2	35.8	2.7	7	3	40	½
2½	Salad, Cold Slaw	3.24	9.15	11.7	24.1	4.1	7	19	24	½
2½	Salad, Combination Green	.9	19.6	3.9	24.4	.5	2	39	9	½
3	Salad, Cucumber Jelly	.5	.3	3	5.8	26.3	1	0	9	1/10
6¾	Salad, Cucumber and Tomato	.8	10	3.8	14.6	6.8	6	68	26	1
2¼	Salad, Date and Apple	2.5	5.8	45.8	54.1	1.85	5	13	107	1¼
1¼	Salad, Date and Walnut	5.9	34.8	58.6	99.3	1	7	44	74	1¼
½	Salad Dressing, French	0	198.07	2.85	201	.5		99	1	1
¾	Salad Dressing, Golden	4	8.5	45	57.5	1.72	3	8	39	½
2¼	Salad, Egg Mayonnaise	13.37	30.66	1.46	44.5	2.25	30	69	1	1
1¾	Salad, Endive and French Dressing	1.1	15.8	4	55.9	2	91	7	1	
3	Salad, Filberts and Celery	4.59	34.92	15.91	55.43	1.8	13	104	58	1¾
2	Salad, French	4.5	3.8	18.9	27.3	3.6	8	7	35	½
2¼	Salad, Fruit	1.98	2.53	26.8	31.3	3.1	5	8	62	¾
3¾	Salad, Fruit a la Cream	1.3	12	20	33.3	3	5	45	75	1¼
4	Salad, Fruit Macedoine No. 1	.9	.5	12.6	14	8	2	1	47	½
3	Salad, Fruit Macedoine No. 2	.9	1.5	11.6	14	6	2	3	45	½

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
1	Salad, Grape Catsup	2.66	7.64	68.2	78.5	1.2	2	7	66	¾
2	Salad, Grape	.82	.85	25.1	26.84	4	1	1	48	½
2¼	Salad, Lettuce and Egg	6.86	41	1.94	50.8	2.25	20	100	5	1¼
1¼	Salad, Lettuce with Lemon	1.1	.6	5	6.7	15	2	1	7	$\frac{1}{10}$
1½	Salad, Lettuce and Mayonnaise	2.7	22	3.8	28.5	3.5	5	38	7	½
2½	Salad, Macedoine	1.35	34.2	12.5	48.5	2	4	89	32	1¼
3	Salad, Mint Jelly	0	0	38	38	3	0	0	100	1
2¼	Salad, Nuttolene and Apple	4.9	10	29.5	44.4	2.25	10	23	67	1
1 ⅓	Salad, Olive, ripe (7)	2	69.1	5	76.1	1.3	2	91	7	1
2	Salad, Orange and Celery	1.3	1.2	19.4	22.04	4	4	4	42	½
2	Salad, Orange and Cocoanut	1.7	21.5	14.6	37.9	2.6	3	43	29	¾
3	Salad, Peas and Celery	6.24	16.02	12.5	34.8	2.8	18	46	36	1
2 ⅔	Salad, Persian	1.7	9.8	34.7	46.3	2	5	27	93	1¼
4½	Salad, Pineapple and Nut	7.46	73.4	9.62	90.54	2.25	13	144	43	2
2	Salad, Pineapple and Strawberry	1.7	3.4	21.5	26.6	3.7	3	6	41	½
2½	Salad, Potato	4.56	25.77	15.06	45.39	2.1	10	57	33	1
2	Salad, Protose and Celery	23.66	67.73	12.56	103.9	.96	44	132	24	2
1	Salad, Radish	1.5	.3	6.7	8.5	11.7	1	0	5	$\frac{1}{16}$
2¼	Salad, Royal	11.6	38.4	6.2	56.2	1.78	25	86	14	1¼
2¼	Salad, Sliced or Chopped Beet	2.7	.3	8.6	11.6	8.65	5	1	19	¼
1	Salad, Split Rail	14	67	19	100	1	14	67	19	1
1¾	Salad, String Bean	.7	51.7	2.3	54.7	1.8	2	93	5	1
2	Salad, Summer	3.79	4.64	6.58	15	5.6	6	8	11	¼
2¼	Salad, Tomato	.85	36.8	4.1	41.9	2.3	2	86	12	1
2¼	Salad, Tomato and Cucumber	2.17	14.3	4.25	20.7	5	5	34	11	½
4	Salad in Tomato Cups	1.86	11.1	5.9	18.9	5.2	7	45	23	¾
4	Salad, Tomato Jelly	3 29	1.77	9.21	14.2	7	11	7	32	½
3½	Salad, Tomato Jelly Mayonnaise	3.17	1.71	8.8	13.6	7.3	12	37	26	¾
4	Salad, Sliced Tomato	1	1.1	4.6	6.7	16	4	4	17	¼
2¼	Salad, Waldorf	5.29	36.1	35	96.3	1	12	131	82	2¼
1 ⅓	Salad, Water-cress	1.1	.6	5	76.1	1.3	2	91	7	1
2	Salad, Water-lily	15	33	1.5	50	2	30	67	3	1
2½	Salad, Vegetable	4.3	4.8	9.2	18.3	5.5	6	6	13	¼
2	Salad, Wintergreen and Apple	.20	.56	25.5	25.8	3.9	0	1	49	½
1½	Salad, Yogurt Cheese	13.5	121.2	3.5	138.3	.5	20	175	5	2
¼	Salad, Yogurt Cheese and Celery	10.76	41.4	4.72	57.12	1.7	2	10	1	⅛
	SALAD DRESSING:									
½	Mayonnaise with Oil	3 4	192.2	1.7	197.6	.48	2	97	1	1
1½	Mayonnaise, Cooked	6.87	67.1	2.85	76.8	1.3	9	88	3	1
1	Mayonnaise, Raw	2.1	196 1	1	199.23	.5	2	196	2	2
1½	Yogurt	3.1	90.2	3.9	97.3	1	5	138	7	1½
1½	Sandwich, Baked Bean	4.27	19.4	23.9	47.57	2	12	62	76	1½
3½	Sandwich, Cheese & Pineapple	8.5	61.3	38.4	89	1.1	30	210	130	3
3½	Sandwich, Cheese & Tomato	8.9	62.5	37.4	89	1.1	30	210	130	3
1¾	Sandwich, Cottage Cheese	11.2	33.9	37.6	82.8	1.2	20	61	69	1½
2	Sandwich, Cucumber	5.8	38.6	32.9	77.5	1.3	11	74	65	1½
1¾	Sandwich, Egg	10	50.12	39.09	99.2	1	15	75	60	1½
1¾	Sandwich, Fig	6.08	30.47	53.66	90.22	1.1	10	50	90	1½
3½	Sandwich, Fruit	6.5	33.7	59	99.2	1	23	118	209	3½
1½	Sandwich, Jelly	7.4	38.6	70.6	116.6	.8	10	49	91	1½
1¾	Sandwich, Jelly and Lettuce	5.6	30.5	49	86.5	1.1	10	54	86	1½
1¾	Sandwich, Lettuce	6.8	38.2	37	82	1.2	12	71	67	1½
1¾	Sandwich, Nuttolene	8.7	42.1	40.4	91.4	1.09	14	70	66	1½
1	Sandwich, Peanut Butter	22.5	106.8	70.9	200.1	.5	22	107	71	2
1¾	Sandwich, Protose Mayonnaise	9	40.7	38.2	88	1.1	15	69	66	1½

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
2¾	Sandwich, Ribbon	7.4	56.5	44.7	109	.91	20	150	130	3
1	Sandwich, Rice Biscuit	8.6	56.8	11.9	77.4	1.4	8	56	11	¾
2¼	Sandwich, Salad	5.07	28.2	28.5	61.9	1.4	12	68	70	1½
3	Sandwich, Yogurt Cheese	10.1	44.3	7.1	74.1	1.3	50	216	84	3½
2½	Sandwich, Yogurt and Jelly	10	35	48.6	93.8	1	28	92	130	2½
1⅝	Sandwich, Yogurt and Olives	7.3	40.9	41.5	89.7	1.6	24	136	140	3
	SAUCES—									
2¼	Bechamel Sauce	3.02	22.4	7.8	33.2	3	7	51	17	¾
2	Brown Cream Sauce	4	13	8.9	25.9	3.9	8	26	16	½
2½	Brown Cream Protose Gravy	7.4	32.6	13.5	53.1	1.88	18	76	31	1¼
2½	Brown Sauce for Entries	1	14.6	5.8	21.4	4.7	2	34	14	½
1	Brown Nut Gravy	7.9	11.8	4.9	24.2	4.15	8	12	5	¼
2¼	Celery Sauce	4.2	31.7	10.3	46.3	2.6	9	69	22	1
1½	Cream Gluten Gravy	4.3	17.8	9.4	31.5	3.12	7	28	15	½
2	Cheese Sauce	3.14	28.8	5.9	37.2	2	6	57	12	¾
2	Creole Sauce	2.3	41.9	5.9	50	2	5	84	11	1
1	Hollandaise Sauce	2.64	98.9	.57	102.1	5	1	48	1	½
1	Mint Sauce	0	0	18.28	18.28	5.4	0	0	25	¼
¾	Mushroom Sauce	2.18	37.6	5.58	45.4	2.6	1	22	2	¼
2¼	Parsley Sauce	3.7	22.9	9	35.6	2.8	7	50	18	¾
2¼	Protose Gravy	6.19	10.50	5.42	22.12	4.52	14	24	12	½
3	Tomato Sauce	2.5	11.5	7.2	21.2	4.9	8	15	52	¾
2¼	Tomato Gravy	1.09	17.15	5.51	23.7	4.2	2	37	11	½
1½	Brown Sauce No. 2	1.51	30.71	3.93	36.15	2.16	2	43	5	½
2¼	Brown Gravy	1.5	30.7	3.9	36.1	2.76	3	64	8	¾
	SAUCES FOR DESSERT—									
1¾	Almond Cream	14.1	83.3	11.6	109.2	.92	19	115	16	1½
¾	Apple Tart	.2	37.3	43.6	81	1.2	0	23	27	½
1⅛	Cocoanut	3.8	20.4	20.1	44.3	2.2	4	23	23	½
½	Cream, Whipped	2.9	49.2	10.14	64.2	1.6	1	20	4	¼
1	Custards	3.89	25.5	21.2	50.6	1.97	4	25	21	½
¾	Golden Sauce	2.4	53.1	71	1.26	.8	2	42	56	1
¾	Hard Sauce	.17	32.6	67	99.7	.72	0	66	134	2
1¼	Lemon Sauce	0	0	37.3	37.3	2.7	0	0	50	½
¾	Meltose Dressing	1.1	4	80.6	81.2	1.23	1	0	49	½
1	Orange Fluff Sauce	2.68	44.39	59.1	106.3	.94	2	42	56	1
1¼	Orange or Liquid Sauce	0	0	64	64	1.5	0	0	75	¾
2½	Peach Sauce for Flakes	0	0	24.4	24.4	3.6	0	0	75	¾
2½	Red Raspberry Sauce for Flakes	0	0	30.6	30.6	3.2	0	0	75	¾
2½	Strawberry Sauce for Flakes	0	0	31.5	31.5	3.1	0	0	75	¾
1¼	Strawberry Sauce	0	0	39.8	39.8	2.5	0	0	50	½
1½	Vanilla Sauce	0	10.6	6	16.6	3.3	0	23	27	½
1½	Brown Sugar Sauce	.02	4.70	69.5	74.7	1.3	1	5	94	1
1½	Lemon Sauce	3.2	48.2	46.9	98.4	1	5	74	71	1½
2½	Sanitas Steak-Tomato	32.3	57	2.9	92.9	1	70	124	6	2
2	Savory Roast	40.6	44.8	53.8	139.2	.7	80	89	106	2¾
3	Savory Spaghetti	9.86	15.98	25.34	51.19	1.9	29	47	74	1½
1½	Sanitas Cutlets with Cream	54.3	138.9	22.26	231.5	.43	82	235	33	3½
2	Sanitas Cutlets	38.2	70.1	7.1	115.4	.87	66	122	12	2
3	Sanitas Fricassee	3.2	30.6	5 99	49.23	2.3	40	91	19	1½
4¼	Scotch Brose,	3.3	1.3	13.4	18	5.6	14	5	56	¾
4	Scotch Bran Brose	3.2	3.2	12.8	19	6	12	12	51	¾
3	Slaw, Hot	2.74	20.8	26.1	49.5	2.1	8	63	79	1½
4¾	Soup, Bean	9.4	4	24.7	38.1	2 6	25	10	65	1
4¾	Soup, Black Bean	6.08	5.1	17.2	28.38	3.5	26	22	77	1¼
4¾	Soup, Bean Broth No. 1	2.8	0	.5	3.3	30.2	14	0	2	⅙

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
4¾	Soup, Bean Broth No. 2	4.3	3.16	11.58	19.1	5.2	22	16	62	1
4¾	Soup, Kidney Bean	11.25	9.48	21.38	42.1	2.37	53	45	102	2
4¾	Soup, Lima Bean	6.58	1.26	24.16	32.1	3.1	31	5	114	1½
4¾	Soup, Navy Bean	9.4	4	24.7	38.1	2.7	25	10	65	1
4¾	Soup, Bean Tapioca	2.17	.4	8.9	11.5	8.7	10	1	39	½
4¾	Soup, Bouillon	6.99	28.11	5.1	40.2	2.5	34	140	26	2
4¾	Soup, Tomato Bouillon	3.62	7.96	4.77	16.37	6.1	17	36	22	¾
4¾	Soup, Vegetable Bouillon	7	4.3	7	18.3	5.49	29	18	28	¾
4¾	Soup, Brown	.54	.2	5.24	6	18	2	1	22	¼
4¾	Soup, Cabbage (raw)	3.4	11.7	5.8	21.2	4.75	17	56	27	1
4¾	Soup, Celery and Tomato	2.7	3.8	6.3	12.8	7.8	10	14	26	½
4¾	Soup, Corn Chowder	2.6	7.8	12.2	22.6	4.8	11	35	54	1
4¾	Soup, Corn Chowder, Washington	2.5	11.2	10.8	24.5	4.6	12	58	55	1¼
4¾	Soup, Cream of Almond	3.1	23.17	3.87	30.15	3.31	16	115	19	1½
4¾	Soup, Cream of Asparagus	3.24	18.33	4.57	26.14	3.82	16	88	21	1¼
4¾	Soup, Cream of Barley	2.11	14.76	17.16	24.03	4.1	12	76	37	1¼
4¾	Soup, Cream of Bean No. 1	6 08	15.2	14.1	35.38	2.85	29	76	70	1¾
4¾	Soup, Cream of Bean No. 2	6.7	12.6	15.2	33.1	3	26	56	68	1½
4¾	Soup, Cream of Browned Onion	3.11	21.34	8.35	32.8	3	15	98	37	1½
4¾	Soup, Cream of Cabbage	2.26	10.85	5.76	18.87	5.29	13	55	32	1
4¾	Soup, Cream of Carrots	3.29	16.1	8.22	27.6	3.62	15	73	37	1¼
4¾	Soup, Cream of Celery	2.86	19.02	4.7	26.58	3.7	13	90	22	1¼
4¾	Soup, Cream of Chestnut	4.4	18.3	15.4	38.1	2.6	20	84	71	1¾
4¾	Soup, Cream of Corn	3.5	18.5	10	32.12	3.1	16	87	47	1½
4¾	Soup, Cream of Dasheen	4.9	15.57	30.9	50.56	1.9	25	75	100	2½
4¾	Soup, Cream of Lentil	10.1	12.6	22.2	45	9.5	45	53	102	2
4¾	Soup, Cream of Lettuce	5.37	28.85	9.68	43.9	2	24	133	43	2
4¾	Soup, Cream of Lima Bean	6.76	14.4	21.69	42.82	2.3	32	68	100	2
4¾	Soup, Cream of Okra	1.5	5.6	10.2	17.4	6.3	5	24	46	¾
4¾	Soup, Cream of Oatmeal	3.39	13.26	9.2	25.9	3.9	17	63	45	1¼
4¾	Soup, Cream of Peas	7.37	12.95	18.49	38.81	2.8	32	57	86	1¾
4¾	Soup, Cream of Peas No. 1	5.9	18	13.2	37.1	2.7	28	84	63	1¾
4¾	Soup, Cream of Potato	2.7	19.2	9	30.9	3.2	13	93	44	1½
4¾	Soup, Cream of Rice	2.9	17	8.8	28.7	3.48	13	74	38	1¼
4¾	Soup, Cream of Rice and Almond	5.8	20.8	8.6	34.5	2.8	21	93	36	1½
4¾	Soup, Cream of Scotch Pea	6.14	14.6	14.1	34.84	2.8	32	72	71	1¾
4¾	Soup, Cream of Spinach	3.55	22	6.45	32	3	16	104	30	1½
4¾	Soup, Cream of Split Pea	6.3	14.6	14.5	35.4	2.83	31	72	72	1¾
4¾	Soup, Cream of Squash	2.9	10.3	21.4	34.6	2.6	15	52	108	1¾
4¾	Soup, Cream of Sweet Potato	4.68	13.34	17 53	35.56	2.8	23	65	87	1¾
4¾	Soup, Cream of Tomato	2.8	20	5.96	28.76	3.4	10	90	25	1¼
4¾	Soup, Cream of Vegetable Oyster	2.4	21	4.6	28	3.6	11	94	20	1¼
4¾	Soup, Creole	7	4.3	7	18.3	5.49	29	18	28	¾
4¾	Soup, Dasheen Tomato	.69	14.18	1.72	16.59	6.25	3	65	7	¾
4¾	Soup, Egg with Dumplings	2.58	34.37	4.19	41.14	2.4	21	152	77	2½
4¾	Soup, Fruit No. 1	.15	.015	26.8	27.05	3.7	1	0	124	1¼
4¾	Soup, Fruit No. 2	.39	.17	29.33	29.9	3	2	1	147	1½
4¾	Soup, Fruit (raw)	.26	.28	21.35	21.89	4.5	1	1	98	1
4¾	Soup, Golden Bouillon	1.29	1.66	4.82	7.7	12.87	4	4	17	¼
4¾	Soup, Italian	1.3	3.9	3.5	8.78	11.4	7	23	20	½
4¾	Soup, Lentil	5.45	3.37	13.27	22.11	14.54	24	16	60	1
4¾	Soup, Lentil No. 1	5.6	.46	11.7	17.3	5.7	22	2	51	¾
4¾	Soup, Mock Chicken Broth	1	14.5	6.4	21.9	4.75	3	67	30	1
4¾	Soup, Noodle	2.2	6.05	8.51	16.8	6.33	10	25	40	¾
4¾	Soup, Nut and Rice	1.27	3.83	2.61	7.72	17.5	4	13	8	¼
4¾	Soup, Nut French	2.2	4.3	4.1	10.76	9.3	10	20	20	½

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
5	Soup, Oatmeal	3.9	40.8	14.7	59.4	1.66	20	205	75	3
4¾	Soup, Okra	.8	.44	2.8	3.6	17.5	6	5	14	¼
4¾	Soup, Peas Consomme	7.1	5.2	8.6	20.9	4.75	34	25	41	1
4¾	Soup, Green Peas	4.8	14.5	7.8	27.2	3.6	21	68	36	1¼
4¾	Soup, Peas and Potato	5.81	14.25	17.13	37.19	2.8	27	67	81	1¾
4¾	Soup, Potato Savory	2	5.2	7.5	14.7	6.8	11	26	38	¾
4¾	Soup, Protose Broth	3.2	.9	2.9	7	14.2	11	3	11	¼
4¾	Soup, Split Peas	7.18	1.85	18.7	27.1	3.6	34	8	83	1¼
4¾	Soup, Split Peas Puree	8.62	15.2	24.7	48.5	2.1	38	71	116	2¼
4¾	Soup, Potato	.88	2.41	7.2	10.5	2.3	4	11	35	½
4¾	Soup, Potato Chowder	2.7	17	10.4	30.1	3.3	13	86	51	1½
4¾	Soup, Potato Chowder (new)	2.7	15.2	11.5	29.5	3.5	15	77	58	1½
4¾	Soup, Saniterrapin	2.3	9.91	2.96	15.2	6.5	11	50	14	¾
4¾	Soup, Savora Broth	0	2.5	1.5	4	2.5	1	15	9	¼
4¾	Soup, Savory Dasheen	.14	4.57	.63	5.34	18	1	22	3	¼
4¾	Soup, Savora Rice	.11	2.46	.9	3.47	18	1	17	7	¼
4¾	Soup, Spinach (raw)	3.34	14.38	5.29	23.1	4.34	15	62	23	1
4¾	Soup, Tomato Bisque	3.1	10.5	2.4	16	6.2	14	50	11	¾
4¾	Soup, Tomato	2	2.3	6.4	10.7	2.3	9	11	30	½
4¾	Soup, Clear Tomato	3.1	7	8.9	19	5.2	17	36	47	1
4¾	Soup, Tomato and Macaroni	1.15	.68	2.97	4.8	20.8	5	3	17	¼
4¾	Soup, Tomato Rice	1	7.8	4.8	13.6	6	6	43	26	¾
4¾	Soup, Tomato Vermicelli	5.4	6.9	4	16.3	6	24	32	19	¾
4¾	Soup, Vegetable	.96	5.71	6.9	13.5	7.4	1	23	26	½
4¾	Soup, Vegetable Bouillon	5.7	.78	21.1	26.8	3.72	17	3	80	1
4¾	Soup, Vegetable Consumme	2.1	.5	7.7	11.3	.9	12	2	36	½
4¾	Soup, Vegetable Oyster	.38	10.7	1.41	11.86	8.7	1	44	5	½
4¾	Soup, Vegetable Oyster, Rev.	.36	6.2	1.41	7.79	14	1	20	4	¼
3	Spaghetti Cutlets	13.82	28.49	32.35	74.6	1.3	41	86	98	2¼
4	Spaghitti Milanaise	6.7	44.6	25.3	76.5	1.7	25	175	100	3
3	Spaghitti Rarebit	7.6	18.6	8.8	35	.33	22	53	25	1
3	Spaghetti and Tomato	5	3.86	17.16	26.02	3.9	15	11	49	¾
3	Spinach	3.3	1	4.93	9.3	10.7	9	3	13	¼
4	Spinach a la Bechamel	3.4	17.6	6.58	27.7	3.4	20	88	17	1¼
3½	Spinach, Creamed	3.5	13.7	5.9	22.39	4.69	10	47	18	¾
4	Spinach on Toast	5.3	28	18.7	52.1	1.9	20	110	70	2
3	Spinach Souffle	6.4	19.3	6.7	32.4	3	20	59	21	1
2½	Squash, Baked	1.6	2.2	16	19.8	5	4	6	40	½
3½	Squash, Steamed or Canned	1	1.3	12.3	14.6	6.8	3	5	42	½
½	Sticks, Cream	10	.9	89.2	100.1	1	5	1	44	½
4	Strawberries, Fresh	1.2	1.6	8.6	11.4	8.7	5	7	38	½
5	Strawberry Juice	0	0	24.5	24.5	4.1	0	0	125	1¼
3½	Strawberry Sauce	.9	1	22.7	24.6	4.07	3	3	69	¾
3	String Beans with Cream	2.34	20.35	3.15	25.84	3.48	7	60	8	¾
3	Succotash	9.25	15.42	32.65	57.34	1.74	28	48	99	1½
⅕	Sugar (Granulated)	0	0	116.6	116.6	.9	0	0	25	¼
3	Swiss Chard	2.5	10.9	3	16.4	6.9	9	1	15	¼
3½	Sweet Potatoes (Cooked)	3.5	5.6	49.1	58.2	1.7	12	19	169	2
5	Tangerines	.9	.5	13.5	14.9	6.9	5	2	68	¾
5	Toast, Apple	1.4	3.48	27.2	32.08	3.12	4	14	132	1½
5	Toast, Apricot	2.2	2.7	27.1	32	3.1	10	12	128	1½
3½	Toast, Asparagus Cream	4	22	65.9	100	1	13	46	66	1¼
5	Toast, Banana	3.2	15.9	22.4	41.5	2.4	13	77	110	2
5	Toast, Blackberry	1.86	5.7	34.8	42.36	2.35	7	26	167	2
5	Toast, Blueberry	1.95	9.23	23.9	35.08	2.8	10	46	119	1¾
½	Toast, Breakfast	11.4	27.5	86.2	125.1	.8	4	12	34	½
5	Toast, Cherry	2.2	4.5	35.8	41.8	2.3	10	20	170	2
1½	Toast, Cinnamon	13.9	29.3	31.2	74.4	1.3	16	40	44	1
5	Toast, Cream	4.15	29.9	13.6	47.65	2.1	18	143	64	2¼
4	Toast, Cream Celery	5.47	32.38	21	58.9	1.6	23	137	90	2½

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
4¼	Toast, Cream Okra	2.1	28.4	6.2	36.8	2.7	14	57	79	1½
2½	Toast, Egg on	14.1	18.2	25.3	57.7	1.7	36	48	66	1½
4½	Toast, French Apple	4.65	9.73	27.4	41.78	2.3	16	39	120	1¾
5	Toast, Grape	1.14	2.63	32.8	36.57	2.7	5	12	158	1¾
5	Toast, Gravy	4.47	23.57	16.72	44.5	2.25	25	116	84	2¼
4¼	Toast, Onions on	4	6.4	21.2	31.6	3	15	25	85	1¼
5	Toast, Peach	1.5	2.45	24.3	28.3	3.5	8	13	129	1½
5	Toast, Prune	1.86	3	32.38	37.24	2.6	8	12	155	1¾
5	Toast, Red Raspberry	2.2	2.7	28.4	33.4	3	12	15	148	1¾
1½	Toast, Russian	14.5	64.9	9.9	89.4	1.1	18	93	14	1¼
5	Toast, Snow Flake	5.09	23.17	14.64	42.9	2.34	21	110	69	2
5	Toast, Strawberry	1.95	3.65	29.05	34.65	2.8	10	19	146	1¾
5	Toast, Tomato	2.26	3.2	16.2	21.66	4.6	9	14	77	1
3	Toast, Baked Tomatoes on	4.7	9.6	20.2	34.6	2.8	18	35	72	1¼
4	Toast, Tomato Cream	5.16	28.8	21.4	55.4	1.8	23	130	97	2½
6	Toast, Creamed Turnips on	3.4	10.7	16.4	30.7	3.2	20	61	94	1¾
5	Toast, Yogurt Cheese	3.96	28	13.9	45.9	2	19	138	68	2¼
3½	Tomatoes, Breaded	1.3	4.5	7.9	13.7	7.3	5	17	28	½
2½	Tomatoes, Stewed or Canned	1.4	.5	4.7	6.6	15.1	5	2	18	¼
5	Tomatoes, Stuffed	1.63	8.94	8.72	19.3	5	8	47	45	1
4	Tomatoes, Sliced	1	1.1	4.6	6.7	16	4	4	17	¼
4	Turkish Pilaf	3.9	1.42	26.8	32.13	3	15	5	105	1¼
3	Turnips, Creamed	2.18	4.6	10.9	17.7	5.6	6	13	31	½
3	Turnips in Drawn Butter Sauce	.6	15.3	3.49	19.39	5.15	1	40	9	½
4	Turnips, Mashed	.6	2.8	2.7	6.1	16.4	2	12	11	¼
1½	Vanilla Egg-Nog	20.6	.8	38.8	60.5	1.6	34	2	64	1
2¾	Vegetable Hash	2.5	7.1	17.4	27	3.7	6	20	49	¾
2½	Vegetable Oysters, Creamed	2.14	12.76	6.17	21	4.75	5	30	15	½
3	Vegetable Oysters, Escalloped	2.5	13.7	8.3	24.5	4	8	42	25	¾
1½	Vegetable Oyster Fritter	3.6	22.5	18.7	44.8	2.3	3	25	22	½
2½	Vegetarian Ham	11.5	30.2	6	47.7	2.2	30	79	16	1¼
4½	Vitos	2.9	1.3	23.7	27.9	3.5	10	4	86	1
2¾	Walnut Roast	9.5	40	22.5	72	1.4	26	112	62	2
1¼	Watercress	1.4	.8	3.4	5.6	17.8	2	1	7	1/10
8	Watermelon	.5	.5	7.8	8.8	11.4	4	4	67	¾
3½	Wheat Brose	1.7	.7	12.6	15	6.5	6	2	42	½
5¾	Wheat, Cracked	3.3	1	22	26.3	3.8	18	6	126	1½
¾	Wheat Flakes, Toasted	11	3.9	88.9	103.8	.96	8	3	64	¾
4	Wheat Grits (Cooked)	2.1	1	15.3	18.4	5.4	9	4	62	¾
5¾	Wheat, Hulled	3.3	1	22	26.3	3.8	18	6	126	1½
7	Whey	1.2	.8	5.8	7.8	12.8	8.4	5.6	40.6	½
½	Whipped Cream	2.9	49.3	10.14	62.3	1.6	1	20	4	¼
1	Whole-wheat Wafers or Crackers	11.4	26	84.5	121.9	.81	12	27	86	1¼
6	Yogurt Buttermilk	4	.8	6	10.8	9.2	28	5	42	¾
1	Zwieback	11.4	26.4	85.8	123.6	.8	11.4	26.4	85.8	1¼

FLESH FOODS

3½	Beef Juice	5.42	1.71	0	7.13	14	19	6	0	¼
2½	Beef, Roasted (Fat)	18.14	136.85	0	155.26	.65	48	352	0	4
2¼	Beef, Round (Boiled, Lean)	40.9	4.54	0	45.6	2.2	90	10	0	1
6	Bouillon	2.3	.3	3	3	33	23	1	1	¼
3¼	Chicken (Broilers)	24.6	6.56	0	31.16	3.2	79	21	0	1
3¾	Clams	7.5	1.08	0	8.58	11.6	28	4	18	½
5	Cod Fish	19.3	1.02	0	20.32	4.9	95	5	0	1
2¾	Goose	18.1	95.4	0	113.5	.88	48	252	0	3
3	Halibut (Steak)	21.78	13.9	0	35.68	2.8	61	39	0	1

Ounces in ordinary serving		Calories Per Ounce				Ounces in one portion of 100 Cal.	Calories Served			
		Proteins	Fats	Carbohydrates	Total		Proteins	Fats	Carbohydrates	Portions served
2	Lamb Chops (Boiled)	25.3	79.7	0	105	.96	48	152	0	2
3½	Lamb (Leg, Roast)	22.2	33.3	0	55.5	1.8	80	120	0	2
3	Liver (Veal)	21.78	13.9	0	35.68	2.8	61	39	0	1
2	Lobsters	19	4.8	0	23.82	4.1	39	10	1	½
2½	Mutton (Leg, Boiled)	29.1	54.1	0	83.2	1.2	70	30	0	1
3½	Oysters	7.2	3.23	0	10.43	6.8	24	12	14	½
1	Pork (Bacon, Smoked Medium Fat)	11.3	177.3	0	188.6	.53	12	188	0	2
2¼	Pork (Ham, Boiled)	25.4	65.4	0	90.3	1.1	56	144	0	2
3	Pork (Loin, Chops)	18.5	84.5	0	103	.97	54	246	0	3
2¼	Salmon (California)	20.4	46.6	0	66.6	1.5	45	105	0	1½
2¼	Shad	21.9	25.71	0	47.61	2.1	46	54	0	1
1¾	Trout (Brook)	22.2	55.5	0	77.7	3.6	40	10	0	½
1¼	Turkey	24.1	59.1	0	83.2	1.2	29	71	0	1
2½	Veal (Leg, Boiled)	30.4	11.2	0	41.6	2.4	73	27	0	1

NUMBER OF FOOD UNITS OR CALORIES PER OUNCE OF VARIOUS UNCOOKED FOODSTUFFS

None of these are served in the uncooked state. The value is given only for the purpose of comparison of actual food values.

	Proteins	Fats	Carbohydrates	Total
Almond Meal	26.0	152.8	21.4	200.2
Artichokes	3.0	.5	19.5	23.0
Asparagus	2.1	.5	3.9	6.5
Barley, Pearled	9.9	2.9	90.8	103.6
Beans (dried)	26.3	4.8	69.5	100.6
Beans, Butter (green)	11.0	1.6	34.0	46.6
Beans, Lima (dried)	21.1	4.0	76.9	102.0
Beans, Soja	38.4	48.3	33.5	120.2
Beets	1.9	.3	11.3	13.5
Beans, String	2.7	.8	8.6	12.1
Buckwheat	7.5	3.2	90.0	100.7
Cabbage	1.9	.8	6.5	9.2
Carrots	1.3	1.1	10.9	13.3
Cauliflower	2.1	1.3	5.5	8.9
Cocoa	25.2	77.1	44.0	146.3
Cocoa, Sanitas	25.6	76.7	44.5	146.8
Corn, Green	3.6	2.9	23.0	29.5
Corn, Parched (Gofio)	13.4	22.4	84.4	120.2
Cornmeal	10.7	5.1	87.9	103.7
Cornstarch			105.0	105.0
Cranberries	.6	1.6	11.5	13.7
Egg Plant	1.4	.8	6.0	8.2
Farina	13.0	3.7	89.0	105.7
Flour, Corn	8.3	3.5	91.5	103.3
Flour, Graham	15.5	5.9	83.3	104.7
Flour, Rye	7.9	2.4	91.8	102.1
Flour, Sanitas Self-Raising Gluten	20.0	4.0	83.4	107.4
Flour, Sanitas Self-Raising Gluten, 40 per cent	46.4	2.7	51.0	100.3
Flour, Wheat (Entire Wheat)	16.1	5.1	83.8	105.0
Flour, Wheat (Fine White)	9.2	3.7	89.1	102.0
Flour, Wheat (Gluten)	16.6	4.8	83.0	104.4
Flour, Wheat, (Pastry)	15.5	5.9	83.3	104.7
Flour, Wheat (Patent)	12.6	2.9	87.7	103.2
Gooseberries	.5		10.4	10.9

	Proteins	Fats	Carbohydrates	Total
Gluten Meal, (20 per cent)	18.4	1.7	83.6	103.7
Hominy	9.7	1.6	92.2	103.5
Kohl-rabi	2.3	.3	6.4	9.0
Lemons	1.2	1.9	10.1	13.2
Lemon Juice	0	0	11.4	11.4
Lentils	30.0	2.7	69.1	101.8
Macaroni	3.5	4.0	18.4	25.9
Mushrooms	4.1	1.1	7.9	13.1
Nut Meal	65.3	90.7	12.8	108.8
Oatmeal	18.8	19.2	78.8	116.8
Oats, Rolled	19.5	19.5	77.2	116.2
Onions	1.9	.8	11.6	14.3
Parsnips	1.9	1.3	15.8	19.0
Peanuts	22.8	77.6	21.6	122.0
Peas (dried)	28.7	2.7	72.3	100.7
Peas, Cow (dried)	25.0	3.7	70.9	99.6
Peas, Green	8.2	1.3	19.7	29.2
Potato Meal	11.3	1.0	97.0	109.3
Potatoes	2.6	.3	21.5	24.4
Prunes	2.5	0	85.8	88.
Pumpkin	1.2	.3	6.1	7.6
Radishes	1.5	.3	6.8	8.6
Rice	9.0	.8	92.0	101.8
Spinach	2.5	.8	3.7	7.0
Squash	1.6	1.3	10.5	13.4
Sweet Potatoes	2.1	1.9	32.0	36.0
Turnips	1.5	.5	9.5	11.5
Vegetable Oysters or Salsify	1.0	5.3	4.1	10.4
Wheat, Cracked	13.0	4.5	88.1	105.6
Wheat Grits	12.3	5.3	88.7	106.3

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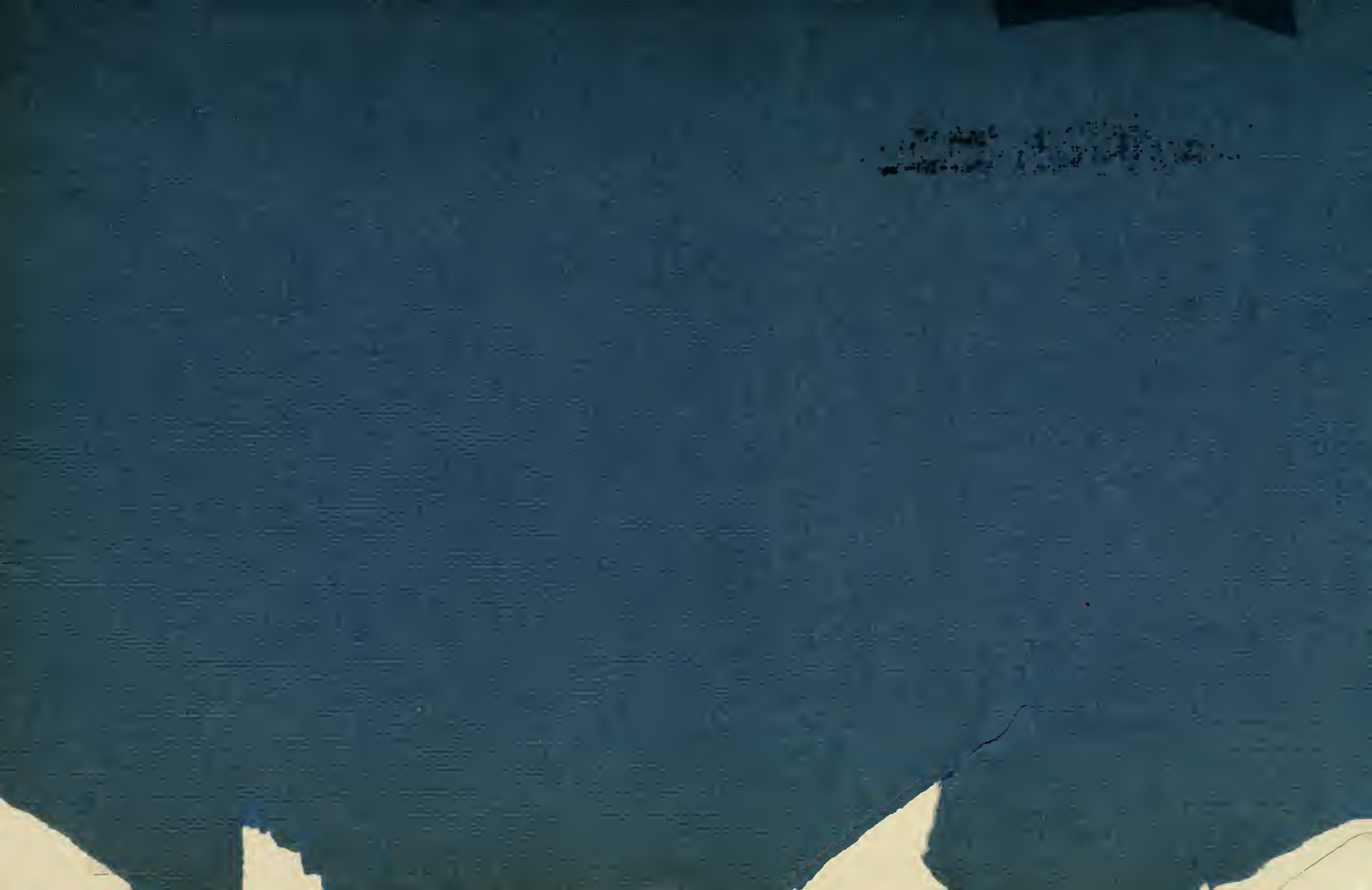

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